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1. Materials for a carcinological fauna of India.
No. 1. The Brachura Oxyrhyncha.
Jour. Asiatic Soc. Bengal, Vol. LXIV, Pt. II,
No. 2, 1895, pp. 157-291, pls. 3-5.
2. Description of a new species of Oxyrhynch Crab of
the Genus Parthenope.
Jour. Asiatic Soc. Bengal, Vol. LXIV, Pt. II,
No. 2, 1895, pp. 296-297.
3. Materials for a carcinological fauna of India.
No. 2. The Brachyura Oxystoma.
Jour. Asiatic Society of Bengal, Vol. LXV,
Pt. II, No. 2, 1896, pp. 134-296, pls. VI-VIII.

MATERIALS

FOR A.

CARCINOLOGICAL FAUNA OF INDIA.

No. 1.

THE BRACHYURA OXYRHYNCHA.

BY

A. ALCOCK, M.B., C.M.Z.S.,

SUPERINTENDENT OF THE INDIAN MUSEUM.

[*Reprinted from the "Journal Asiatic Society of Bengal,"*
Vol. LXIV. Part II, No. 2, 1895.]

CALCUTTA.

PRINTED AT THE BAPTIST MISSION PRESS.

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INVERTEBRATE
ZOOLOGY
Crustacea

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Materials for a Carcinological Fauna of India. No. 1. The Brachyura Oxyrhyncha.—By A. ALCOCK, M.B., C.M.Z.S., Superintendent of the Indian Museum.

Plates III-V.

[Received 11th April:—Read 1st May.]

It was the intention of my immediate predecessor and late friend James Wood-Mason to write a Descriptive Catalogue of the collection of Crustacea in the Indian Museum.

To this end he had collected a very comprehensive Crustacean literature, and had set in motion a scheme for extracting in a handy form the references contained therein.

He had also roughly sorted the whole collection into its component great-groups, and had made a large number of identifications.

In short he had, before his sad and premature death, collected the raw material for, and sketched the broad foundations of, a work that, had he lived on in unimpaired health, might have been a fit companion and sequel to the classical volumes of that great naturalist Henri Milne-Edwards.

Only in the case of the *Stomapoda* had he gone further than this; and I am now preparing to edit, from the rough MS. notes at my disposal, his account of a part of this Order as represented in the collection of the Indian Museum.

The present paper is the first of a series in which I hope to be able to turn to some—though inadequate—account the mass of material accumulated by my predecessor.

My own work in this paper has been to complete, to arrange systematically, to collate, and to verify the available references to the literature of the Oxyrhyncha; to determine about 70 per cent. of the Indian species contained in the collection of the Indian Museum; to prepare the generic diagnoses and the descriptions of all the species mentioned; and to work out, to the best of my ability, keys—which I hope may be of use to naturalists in India—to sub-families, genera, and species.

In the arrangement of the group as a whole, I have been guided and assisted by the *Revision of the Malacostracous Crustacea*, by Mr. E. J. Miers,

in the Journal of the Linnæan Society (Zoology), Vol. XIV. 1879; and by the same author's *Report on the 'Challenger' Brachyura*; and to these important works I have here to acknowledge my great indebtedness.

I have not, however, been able to give my complete adherence to the classification proposed by Mr. Miers, further than to accept the previously adopted division of the Oxyrhyncha into two groups of equal value—the Maioids and the Parthenopoids. To these groups, I would, following Dr. Claus, give the rank of families—*Maiidæ* and *Parthenopidæ*.

But to further sub-divide a group like the Maioids—in which we find, as Miers himself remarks, every reasonable gradation of form from *Stenorhynchus* to *Pericera*—into separate families, as is done by Miers, involves, I think, an unnecessary and unphilosophical interference with the meaning of the term 'family.'

Nor is anything gained, from the point of view of the practical systematist, by establishing families which overlap in all directions.

I am so much indebted to the works of Mr. Miers, that I should be loath to criticize them in any but a friendly spirit. But it seems to me that while Mr. Miers has recognized the value of certain characters round the developments and modifications of which the Maioid Crabs easily cleave into most natural groups, he has proceeded in practice to ignore in great measure the value of his own generalization.

It appears to me that Mr. Miers' families of *Maiinea* consist each of a quite natural nucleus hidden in a loose artificial wrapping.

Beginning with the *Inachidæ* of Miers, we find a natural group, typified by such forms as *Leptopodia* and *Inachus*, linked with forms like *Anamathia*, *Xenocarcinus*, *Huenia*, *Pugettia*, *Acanthonyx*, *Doclea* and *Stenocionops*, none of which are any more nearly related to *Leptopodia* and *Inachus* than they are to any other Maioid.

In the *Maiidæ* of Miers again, we find a most arbitrary jumble of forms. Amid the confusion, however, we can discern a large natural nucleus, typified not, it is true, by *Maiu*, but by such forms as *Egeria*, *Chionacetes*, *Pisa*, *Naxia*, etc.; but these are no more nearly related to *Maiu*, *Paramithrax*, *Schizophrys*, *Oriocarcinus*, and *Micippa* than they are to any other Maioid.

The third family, *Periceridæ*, is even more bewildering; but as Miers himself, in his *Report on the 'Challenger' Brachyura*, has distributed many of his original Periceroid genera among the other two families, it would be unjust to enter into any detailed criticism of this family now.

The classification proposed in this paper is in many respects a reversion to the older authors.

For a most interesting and instructive historical and critical review of the Oxyrhyncha as a whole, I would refer to the Introduction of Miers' paper, already cited, in the Journal of the Linnæan Society, Zoology, Vol. XIV. 1879, pp. 634-642.

I have only to add that as almost all the new species described in this paper have been dredged by the 'Investigator,' they will be figured in next year's issue of the "Illustrations of the Zoology of the 'Investigator.'"

Tribe OXYRHYNCHA or MAIOIDEA.

Oxyrinques, *Oxyrinchi*, Latr. Hist. Nat. Crust. et Insect. tom. VI. p. 85.

Oxyrhinques et *Canceriens Cryptopodes*, Milne-Edwards, Hist. Nat. Crust. tom. I. pp. 263, 368.

Maiioidea or *Oxyrhyncha*, Dana, U. S. Expl. Exp. Crust. Pt. I. pp. 66, 67 and 75.

Oxyrhyncha, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 634; and 'Challenger' Brachyura, p. 2.

Carapace more or less narrowed in front, and usually produced to form a rostrum: branchial regions considerably developed, hepatic regions small. Epistome usually large; buccal cavity quadrate, with the anterior margin usually straight. Branchiæ almost always nine in number on either side*: their efferent channels open at the sides of the endostome or palate. Antennules longitudinally folded. The palp of the external maxillipeds is articulated either at the summit or at the antero-internal angle of the meropodite. (The external genitalia of the male are inserted at the bases of the fifth pair of trunk-legs.)

The Oxyrhyncha may be sub-divided into two families, namely:—

(1) the *Maiidæ*, in which the basal joint of the antennæ is well developed, and in which it is exceptional to find the chelipeds vastly longer than the other legs;

and (2) the *Parthenopidæ*, in which the basal joint of the antennæ is very small, and is embedded between the front and the floor of the orbit; and in which it is exceptional not to find the chelipeds vastly longer and vastly more massive than the other legs.

* *Encephaloides* is the only Oxyrhynch known to me in which the branchiæ are less than nine in number on either side: in *Encephaloides* the reduction, both in size and number, of the anterior branchiæ seems to be due to the enormous development of the four posterior branchiæ.

Family I. MAIIDÆ.

Macropodiens and *Maïens*, Milne-Edwards, Hist. Nat. Crust. I. 272.

Maïnea, Dana, U. S. Expl. Exp. Crust. Pt. I. pp. 76 and 77, (and *Oncininea*.)

Maïnea, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 640; and 'Challenger' Brachyura, p. 2.

Basal antennal joint well developed, and occupying all the space between the antennular fossa and the eye.

Taking the characters sagaciously suggested by Miers, namely, the relative development of the component parts of the orbit, including basal antennal joint—as the basis of a division, the members of the family *Maiidæ* fall into four natural groups or sub-families as follows:—

Key to the Sub-families of Maiidæ.

Sub-family I. *Inachinæ*. Eyes without orbits: the eyestalks, which are generally long, are either non-retractile, or are retractile against the sides of the carapace, or against an acute post-ocular spine that affords no concealment. The basal joint of the antennæ is extremely slender throughout its extent, and is usually long:—

Alliance 1. *Leptopodioida*. Basal joint of the antennæ usually sub-cylindrical, or at any rate convex ventrally, often independent of the neighbouring structures: the external maxillipeds have the merus narrower than the ischium, and the palp large and coarse, and hence have a somewhat pediform appearance.

Alliance 2. *Inachoida*. Basal joint of the antennæ flattened or concave ventrally, and intimately fused with the neighbouring parts; its antero-external angle often produced to form a spine visible from above: the external maxillipeds have the merus at least as broad as the ischium, and the (small) palp borne at the internal angle of the merus.

Sub-family II. *Acanthonychinæ*. Eyes without true orbits: the eyestalks, which are very short or sometimes even obsolescent, are either concealed beneath a forwardly-produced supra-ocular spine, or are sunk in the sides of a huge beak-like rostrum; a postocular spine or process is sometimes present, but is not excavated for the reception of the retracted eye. The basal antennal joint is truncate-triangular. The external maxillipeds have the merus as broad as the ischium.

Sub-family III. *Pisinæ*. Eyes with commencing orbits, of which one of the most characteristic parts is a large, blunt, usually but not

always isolated, cupped post-ocular process into which the eye is retractile, but never to such an extent as to completely conceal the cornea from dorsal—still less from ventral—view; there is almost always also a distinct supraocular eave, which is sometimes produced forwards as a spine: the eyestalks are short. The basal antennal joint is broad; its antero-external angle is generally produced forwards, as a spine or tooth. The external maxillipeds have the merus as broad as the ischium.

Alliance 1. *Pisoida*. Post-ocular cup distinctly isolated from the supra-ocular eave by a gap or fissure.

Alliance. 2. *Lissoida*. Post-ocular cup in the closest contact with the supra-ocular eave, a suture only intervening.

Sub-family IV. *Mainæ*. Eyes either (1) with orbits, which may be incomplete or complete, but are always complete enough to entirely conceal the fully retracted cornea from dorsal view; or (2) but partially protected by a huge horn-like or antler-like supra-ocular spine, or by a large jagged post-ocular tooth (*Paramicippa tuberculosa*, Edw.), or by both. The eyestalks are usually long.

The orbit, when present, is formed in one of two ways; there is always an arched—often very strongly arched—supra-ocular eave, and a prominent post-ocular spine; and either (1) the interval between the eave and the spine is filled by another spine, in which case the roof of the orbit, though fissured, is fairly complete; or (2) the supra-ocular eave and the post-ocular spine are in contact with one another above, and below with a process of the basal antennal joint, in which case the orbit has not only a complete or nearly complete roof, but a complete or nearly complete floor also.

The basal antennal joint is always very broad, and is either very extensively produced outwards to aid in forming the floor of the orbit, or is armed distally with one or two large spines.

The external maxillipeds have the merus at least as wide as the ischium.

Alliance 1. *Maioida*. The orbit is formed (1) by a supra-ocular hood, the postero-external angle of which is often produced as a spine, (2) by a sharp post-ocular tooth, and (3) by a spine intercalated between the two. Basal antennal joint broad, but not specially produced to form a floor to the orbit; usually armed at both its anterior angles with a strong spine.

Alliance 2. *Stenocionopoida*. There is no true orbit; but either a huge, outstanding, often more or less hollowed, horn-like or antler-like supra-ocular spine, or a postocular tooth, or both. The basal antennal

joint is broad, and either has, or has not, one or both of its anterior angles armed with a strong spine. The merus of the external maxillipeds usually has its antero-external angle strongly dilated; and the buccal frame is often much wider in front than behind.

Alliance 3. *Periceroida*. The carapace is broadened anteriorly by the outstanding, often tubular, orbits: the orbits are formed (1) by an arched supra-ocular hood, or semi-tubular horn, (2) by a hollowed post-ocular process, and (3) by a remarkable broadening, or by a prolongation, of the anterior part of the basal antennal joint; and they afford complete concealment to the retracted eye. The rostrum is often more or less deflexed.

I am afraid that this last sub-family will, at first, meet with hostile criticism; but I feel pretty sure that it is a natural group. For, taking the nature of the orbits, eyes, and basal antennal joint as the primary bond of relation, we find, if we exclude the aberrant *Stenocionopoida*, a regular gradation from the imperfect orbit and the narrower basal antennal joint of *Maia*, through the more perfect orbit and broader basal antennal joint of, e.g., *Micippa thalia* and *Micippa cristata*, to the perfect tubular orbit of *Microphrys* (if *Microphrys cornutus* be the type), *Tiarinia* and *Macroceloma*. The *Stenocionopoida* again are linked on, through *Picrocerus* and *Picroceroides*, to the *Periceroida*; and, on the other hand, through *Criocarcinus* to the Maioid *Chlorinoides*.

The following is a list of the genera of Maioid Crabs, so far as known to me, arranged in accordance with the afore-proposed classification. Within each sub-family the genera are arranged alphabetically. Indian genera are printed in roman type, and all genera known to me by autopsy are marked with an asterisk.

Complete references are not given; but only references to the best diagnoses with which I am acquainted. The bibliography of Indian genera will be found in the sequel.

Family **Maiidæ**.

Sub-family I. *Inachinæ*.

ALLIANCE I. **LEPTOPODIOIDA**.

* *Achæus*.

Achæopsis, Stimpson, Proc. Ac. Nat. Sci. Philad., 1857, p. 219.

‡ *Anisonotus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 195.

* *Camposcia*.

Cyrtomaia, Miers, 'Challenger' Brachyura, p. 14.

* *Echinoplax*.

Ergasticus, A. M-E., Miers, 'Challenger' Brachyura, p. 29.

Ericerus, Mary J. Rathbun, Proc. U. S. Nat. Mus., Vol. XVI. p. 223.

Leptopodia, Leach, Zool. Miscell. II. 15: Milne-Edwards Hist. Nat. Crust. I. 275 (Synonymy see Miers, Journ. Linn. Soc. Zool. XIV. 1879, p. 643).

Lispognathus, A. Milne-Edwards, Bull. Mus. Comp. Zool. Vol. VIII. 1880-81, p. 9; and Miss. Sci. Mex. Crust. I. p. 349: and Miers 'Challenger' Brachyura, p. 27.

* *Macrocheira*, de Haan, Faun. Japon. Crust., p. 88: and Miers, 'Challenger' Brachyura, p. 33.

Metoporphis, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. VII. 1862, p. 198.

* *Oncinopus*.

Pactolus, Leach, Zool. Miscell. II. 19: Milne-Edwards, Hist. Nat. Crust. II. 189 .

* *Paratymolus*.

* *Platymaia*.

Pleistacantha, Miers, P. Z. S., 1879, p. 24.

Podochela, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. II. 1862, p. 194, (Synon. *Podonema*, Stimpson, Bull. Mus. Comp. Zool., Vol. II. 1870-71, p. 126).

* *Stenorhynchus*, Lamk., Milne-Edwards, Hist. Nat. Crust. I. 278 (Syn. Miers, Journ. Linn. Soc. Zool., XIV. 1879, p. 643).

New genera:—*Lambrachæus*, *Physachæus*, *Grypachæus*.

ALLIANCE II. INACHOIDA.

Anacinetops, Miers, Ann. Mag. Nat. Hist. 1879, Vol. IV. p. 3.

Anasimus, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 360.

Anomalopus, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 124.

* *Apocremnus*.

Arachnopsis, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 121.

Batrachonotus, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71. p. 122.

* *Collodes*.

* *Encephaloides*.

Erileptus (? = *Anasimus*), Mary J. Rathbun, Proc. U. S. Nat. Mus. Vol. XVI. 1893, page 226.

??? *Euclinetops*, Stimpson, Ann. Lyc. Nat. Hist. New York, Vol.

VII. 1862, p. 191 (more probably, as Stimpson himself suggested, allied to *Micippa*).

Euprognatha, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 122.

Eurypodius, Guérin; Milne-Edwards, Hist. Nat. Crust. I. 283.

Gonatorhynchus, Haswell, Cat. Austral. Crust., p. 10.

Halimus, Latr., Edw., Milne-Edwards, Hist. Nat. Crust. I. 340.

* *Inachus*, Fabr., Edw., Milne-Edwards, Hist. Nat. Crust. I. 286.

* *Inachoides*.

* *Microhalimus*, Haswell, Cat. Austral. Crust., p. 7.

Neorhynchus, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 186,
(= *Microrhynchus*, Bell, P. Z. S., 1835, p. 88, and Trans. Z. S. II. 1841,
p. 40).

Oregonia, Dana, U. S. Expl. Exp. Crust. I. p. 105.

Pyromaia, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 109.

* *Trichoplatus*, A. Milne-Edwards, Ann. Sci. Nat. (6) IV. 1876,
Art. 9, p. 2.

Sub-family, II. *Acanthonychidæ*.

* *Acanthonyx*.

• *Antilibinia*, Macleay, in Smith's Ill. Zool. S. Africa, p. 56.

Cyclonyx, Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 6.

Dehaanius, Macleay, in Smith's Ill. Zool. S. Africa, p. 57.

Epialtus, Milne-Edwards, Hist. Nat. Crust. I. 344.

• *Eupleurodon*, Stimpson, Ann. Lyc. Nat. Hist. New York, Vol. X.
1874, p. 98.

Goniothorax, A. Milne-Edwards. Bull. Soc. Philom. (7) III. 1878-79,
p. 103.

* *Huenia*.

• *Leucippa*, Milne-Edwards, Hist. Nat. Crust. I. 345.

• *Mimulus*, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. VII.
1860, p. 199.

Peltinia, Dana, U. S. Expl. Exp. Crust. I. p. 129.

> * *Menæthius*.

• *Mocosoa*, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 128.

• * *Pugettia*.

? * *Scyramathia*.

* *Simocarcinus*.

• * *Sphenocarcinus*, (? = *Oxypleurodon*, Meirs, 'Challenger' Brachyura,
p. 38.)

Trigonothir, Miers, Ann. Mag. Nat. Hist. 1879, Vol. IV. p. 4.

* *Xenocarcinus*.

Sub-family III. *Pisinæ*.ALLIANCE I. *PISOIDA*.

Arctopisis, Lamk. see *Pisa* emend. Miers, *infra*.

Acanthophrys, A. Milne-Edwards (as limited by Miers, J. L. S. Zool. XIV. 656), Ann. Soc. Entom. Fr. (4) V. 1865, p. 141, pl. v. fig. 3.

* *Anamathia*, Roux ; Milne-Edwards, Hist. Nat. Crust. I. 285.

Chionæcetes, Kroyer ; Miers, Journ. Linn. Soc. Zool. XIV. 1879, p. 654 (Syn. *Peloplastus*, see Miers, J. L. S., Zool. XIV. 654).

* *Chorilibinia*.

Chorinus, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 314.

? * *Doclea*.

* *Egeria*.

Ne ? *Esopus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 89.

* *Eurynome*, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 350.

Hoplopisa, A. Milne-Edwards, Bull. Soc. Philom. (7) II. 1877-78, p. 222 ; and Miss. Sci. Mex. Crust. I. p. 201.

* *Hyas*, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 311.

* *Hyastenus* (Syn. *Lahainia* and *Chorilia*.)

Lepteces, Mary J. Rathbun, P. U. S. N. M., Vol. XVI. 1893, p. 83.

Libidoclea, Edw. and Lucas, Voy. Amer. Merid. Crust., p. 6.

* *Libinia*, Leach ; Milne-Edwards, Hist. Nat. Crust. I. 298.

Lepidonaxia, Zool. Record, 1877, Crust., p. 11.

Loxorhynchus, Stimpson, Journ. Bost. Soc. Nat. Hist., Vol. VI. 1857, p. 451.

* *Naxia* (Syn. *Naxioides* and *Podopisa*).

? *Nibilia*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 132.

Notolopas, Stimpson, Ann. Lyc. Nat. Hist. New York, X. 1874, p. 96.

Pelia Bell, Trans. Zool. Soc. II. 1841, p. 44.

* *Pisa*, Leach, Miers ; Miers, 'Challenger' Brachyura, p. 53.

? *Pisoides*, Edw. and Lucas, Voy. Amer. Merid. Crust., p. 10.

Prionorhynchus, Jacquinot and Lucas, Voy. Pôle Sud, l' Astrolabe et la Zélée, tom. III. Crust., p. 5.

? *Pyria*, Dana, U. S. Expl. Exp. Crust. I. p. 96.

Rachinia, A. Milne-Edwards, Miss. Sci. Mex., pl. xviii., fig. 1 (if this genus is distinct from *Scyramathia*).

Salacia, Edw. and Lucas, Voy. Amer. Merid. Crust., p. 12.

Scyra, Dana, U. S. Expl. Exp. Crust. I. p. 95.

? * *Scyramathia* (Syn. ? *Rachinia*).

Trachymaia, A. Milne-Edwards, Bull. Mus. Comp. Zool. VIII. 1880-81, p. 3 ; and Miss. Sci. Mex. Crust. I. p. 351.

ALLIANCE II. LISSOIDA.

? *Coelocerus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 84.

Herbstia, Milne-Edwards, Hist. Nat. Crust. I. 301 (Syn. *Rhodia*, Bell, T. Z. S. II. 1841, p. 43; *Micropisa*, Stimpson, Proc. Ac. Nat. Sci. Philad., 1857, p. 217; *Herbstiella*, Stimpson, Ann. Lyc. Nat. Hist. New York, X. 1874, p. 93).

* *Hoplophrys*.

Lissa, Leach; Milne-Edwards, Hist. Nat. Crust. I. 310.

Parathoe, Miers, Ann. Mag. Nat. Hist, 1879, Vol. IV. p. 16.

Perinea, Dana, U. S. Expl. Exp. Crust. I. p. 114.

* *Tylocarcinus*.

Sub-family IV. *Mainæ*.

ALLIANCE I. MAIOIDA.

* *Cyclax* (*Cyclomaia*).

* *Maia*.

Maiella, Ortmann, Zool. Jahrb. Syst. &c., VII. 1893-94, p. 51.

Maiopsis, Faxon, Bull. Mus. Comp. Zool., XXIV. 1893, p. 150.

Nemausa, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 80.

* *Paramithrax* (* *Leptomithrax*, * *Chlorinoides*).

? *Phycodes*, A. Milne-Edwards, Rev. et Mag. Zool. (2) XXI. 1869, p. 374.

? *Pleurophricus*, A. Milne-Edwards, Journ. Mus. Godeffr., I. Crust. p. 260.

* *Schizophrys* (*Dione*).

Temnonotus, A. Milne-Edwards, Miss. Sic. Mex. Crust. I. p. 82.

ALLIANCE II. (STENOCLIONOPOIDA,

* *Criocarcinus*.

? *Euclinetops*, Stimpson, Ann. Lyc. Nat. Hist. New York, VII. 1862, p. 191.

* *Paramiccippa*, Edw. Milne-Edwards, Hist. Nat. Crust. I. 332.

Picrocerus, A. Milne-Edwards, Ann. Soc. Ent. Fr. (4) V. 1865, p. 136.

Pseudomicippa, Heller, Crust. Roth. Meer., SB. Ak. Wien, XLIII. 1861, p. 301; and Miers 'Challenger' Brachyura, p. 68 (*nec syn. Microhalimus*).

(*Stenocionops*)

Stilbognathus, E. Martens, Verh. zool.-bot. Ges. Wien, XVI. 1866, p. 379.

Tyche, Bell, P. Z. S. 1835, p. 172, and T. Z. S. II. 1841, p. 58 (*syn.*

Platyrinchus, Desbonne and Schramm, Crust. Guadeloupe, p. 3).

ALLIANCE III. PERICEROIDA.

? *Ala*, Lockington, Proc. Calif. Acad. Sci. VII. 1876, p. 65.

Anaptychus, Stimpson, Ann. Lyc. Nat. Hist. New York, VII. 1862, p. 183.

? *Coelocerus*, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 84.

Cyclocoeloma, Miers, Ann. Mag. Nat. Hist. 1880, Vol. V. p. 228.

* *Cyphocarcinus*.

Hemus, A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 88.

Leptopisa, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 114.

* *Macrocoeloma* (Entomonyx: both these genera of Miers seem to me to be synonymous with *Micippoides* of A. Milne-Edwards.)

* *Micippa*.

Micippoides, A. Milne-Edwards, Journ. Mus. Godeffr. I. Crust. 254 (probably *Macrocoeloma* and *Entomonyx* may be here included).

* *Microphrys*, Edw.; Milne-Edwards, Ann. Sci. Nat. Zool. (3) XVI. 1851, p. 251; and Miers, 'Challenger' Brachyura, p. 82 (*syn. Milnia*, Stimpson, Ann. Lyc. Nat. Hist. New York, VII. 1862, p. 179: *Omalacantha*, Hale Streets, Proc. Ac. Nat. Sci. Philad. 1871, p. 238; and A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 64: *Fisheria*, Lockington, Proc. Calif. Ac. Sci. VII. 1876, p. 72).

Mithrax, Leach; Milne-Edwards, Hist. Nat. Crust. I. 317; and Miers, 'Challenger' Brachyura, p. 84 (*syn. Mithraculus*, White, vide Miers. J. L. S. Zool. XIV. 1879, p. 667: *Teleophrys*, Stimpson, Amer. Journ. Sci and Arts. (2) XXIX. 1860, p. 133.)

Othonia, Bell (*Pitho*, Bell, P. Z. S. 1835, p. 172: *Othonia*, Bell T. Z. S. II. 55): and A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 114.

Pericera, Latr., Edw.; Milne-Edwards, Hist. Nat. Crust. I. 334; and Miers, 'Challenger' Brachyura, p. 76.

Picroceroides, Miers, 'Challenger' Brachyura, p. 77.

(This genus, though placed in this alliance on account of the structure of the orbits and basal antennal joint, is in many respects more closely allied to the *Stenocionopoida*).

Sisyphus, Desbonne Schramm, Crust. Guadeloupe, p. 20.

? *Thoe*, Bell, P. Z. S., 1835, p. 171: A. Milne-Edwards, Miss. Sci. Mex. Crust. I. p. 120 (*syn., sec.* Miers J. L. S. Zool. XIV. 667; *Platypes*, Lockington, Proc. Calif. Ac. Sci. VII. 1876, p. 41).

* *Tiarinia*.

The genus *Podohuenia*, placed among the Periceridæ in the Zoological Record for 1892 (Crust., p. 17), is inaccessible to me. The reference in the Zoological Record is to Boll. Soc. Nat. Napoli, III. 1889, p. 180.

Sub-family INACHINÆ (see Table I.).

Alliance I. LEPTOPODIOIDA (see Table I.).

LAMBRACHÆUS, n. gen.

Closely allied to *Leptopodia* and *Metoporphis*, from which it differs (1) in its extremely long sub-cylindrical neck, (2) in its minute antennæ and (3) in the *Lambrus*-like proportions of its chelipeds.

Eyes antennules and antennæ borne at the end of a long narrow subcylindrical "neck," which is continued onwards as an extremely long slender spiny rostrum.

Eyes stoutish, salient and non-retractile: no defined orbits: a small postocular spine. Antennæ minute, exposed to dorsal view. Chelipeds stout and extremely long, with long sub-cylindrical palms and short fingers.

Legs very slender: shorter than the chelipeds.

Lambrachæus ramifer, n. sp., Plate III. fig. 1.

The body is formed by (1) a small trunk, (2) a long narrow almost cylindrical prestomial "neck," and (3) a long slender sinuous spiny rostrum shaped like a withered branch.

The carapace proper is trilobed, the lateral lobes being formed by the branchial regions, and the front lobe being formed by the wings of the buccal frame.

The "neck," at the end of which are borne the eyes, antennules, and antennæ, is rather longer than the carapace proper.

The rostrum is nearly twice the combined length of the neck and carapace.

The eyes are salient and non-retractile, and though there is a narrow dorsal cave round the base of the eyestalks and a pair of tiny postocular spines, there is nothing like an orbit present. The cornea is surmounted by a little tooth.

The antennæ are minute and filiform, and are completely exposed: their total length is not one-sixth that of the rostrum.

The antennules are of large proportions: they fold longitudinally, but when folded are much beyond the capacity of the narrow shallow antennulary fossæ.

The external maxillipeds have broad endopodites, and completely cover the buccal frame: the merus is expanded in both directions, but most at its internal angle, so that the flagellum is inserted nearer to the external angle.

Eyes without orbits; the eye-stalks usually long and slender, and affords no concealment. The basal joint of the antennæ is extremely (in *Platymaia* apparently trifid).

Alliance 1. LEPTOPODIOIDA. Antennæ with the basal joint usually with the merus narrower than the ischium, and often with a large cox

- | | | | | | | |
|--|---|---|---|---|--|----------------|
| I. Carapace of the typical Oxyrhynch shape, elongate-triangular or pyriform. | { | 1. Carapace well-calcified, not depressed: rostrum separated from the carapace by a distinct post-ocular constriction, which sometimes forms a long "neck." | { | i. Chelipeds both marked the carapace: post-ocular | a. Free the ant duncle cylindr not coa sute: almost rostrui tal. | |
| | | | { | ii. Chelipeds never approaching the longest legs in length: rostrum bifid and never approaching the carapace in length: post-ocular neck, when distinct, short. | | b. Free rostru |
| | | | { | | | |
| | | 2. Carapace semi-membranous, exceedingly de | | | | |
| | | the last pair of legs subdorsal in position..... | | | | |

II. Carapace nearly circular. [Epistome narrow: a large post-ocular joint perfectly free, legs long, with much flattened blade-like

Alliance 2. INACHOIDA. Antennæ with the basal joint flattened or co external angle produced to form a spine which is visible from abo broader than the ischium, and with the palp small.

I. Rostrum simple: post-ocular spine small: basal antennal spine moderate.

II. Rostrum bifid: post-ocular spine large: basal antennal spine large

Table I. Sub-family INACHINÆ.

Eyes without orbits; the eye-stalks usually long and slender, and either non-retractile, or retractile against the carapace or against an acute post-ocular spinule or spine that affords no concealment. The basal joint of the antennæ is extremely slender throughout, and is usually long. Legs slender. Rostrum either simple, or two-spined, or emarginate (in *Platymaia* apparently trifid).

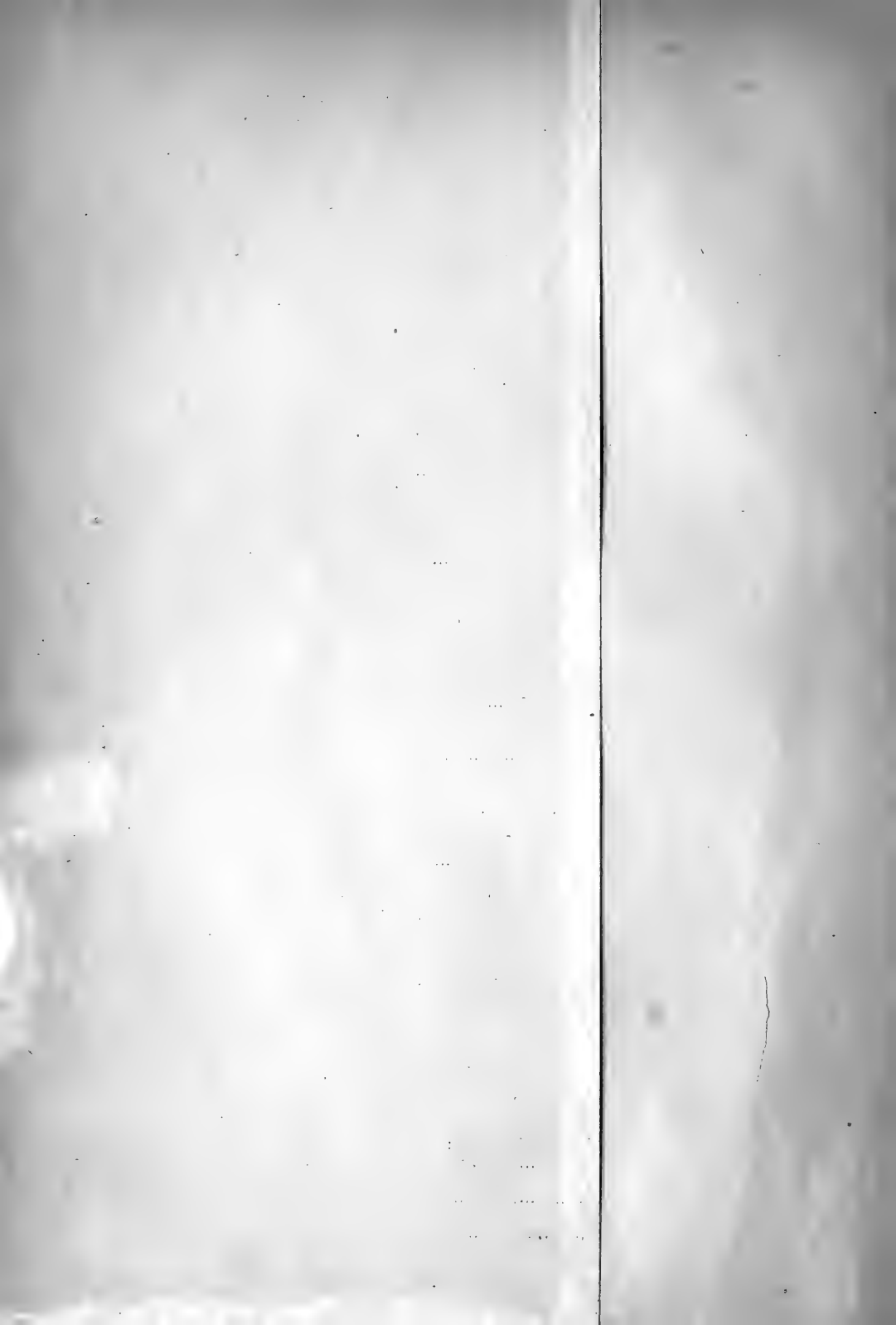
Key to the Indian Genera.

Alliance 1. LEPTOPODIODA. Antennæ with the basal joint usually sub-cylindrical, or at any rate usually convex on the ventral surface, and independent. External maxillipeds with the merus narrower than the ischium, and often with a large coarse palp, and therefore somewhat pediform in shape.

I. Carapace of the typical Oxyrhynch shape, elongate-triangular or pyri-form.	1. Carapace well-calcified, not depressed: rostrum separated from the carapace by a distinct post-ocular constriction, which sometimes forms a long "neck"	i. Chelipeds never approaching the longest legs in length: rostrum bifid and never approaching the carapace in length: post-ocular neck, when distinct, short.	a. Free joints of the antennal peduncle slender, cylindrical and not coarsely hirsute: eye-stalks almost straight: rostrum horizontal.	a. ¹ Eye-stalks salient, but freely moveable forwards and sometimes backwards: basal antennal joint not reaching to the apex of the rostrum.	a. ² Basal antennal joint long: epistome spacious.	a. ³ Body and appendages very spiny: some post-ocular spinules: eye-stalks retractile backwards, but never concealed.	a. ⁴ Rostrum formed of two long spines; none of the legs subchelate.....	LAMBACHÆUS.
								ECHINOPLAX.
								GRYPACHÆUS.
								ACHÆUS.
								PARATYMOLOS.
								PHYSACHÆUS.
								CAMPOSCIA.
								ONCINOPUS.
								PLATYMAIA.
	2. Carapace semi-membranous, exceedingly depressed and flat: rostrum in unbroken continuity with the carapace: no post-ocular spine: the last pair of legs subdorsal in position.....	ii. Chelipeds never approaching the longest legs in length: rostrum bifid and never approaching the carapace in length: post-ocular neck, when distinct, short.	b. Free joints of the antennal peduncle short, flat, and densely hairy: eye-stalks much curved: rostrum somewhat depressed: a post-ocular tooth.....	b. ¹ Eye-stalks salient and rigidly immovable: basal antennal joint projecting beyond and above the apex of the rostrum.....	b. ² Basal antennal joint very short, not reaching to the front: epistome very narrow.....	b. ³ Body and appendages smooth or with very few spines: no post-ocular spine: the eye-stalks hardly moveable backwards.....	b. ⁴ Rostrum short, bifid: last pair of legs subchelate.....	
II. Carapace nearly circular. [Epistome narrow: a large post-ocular spine against which the eye is retractile, but which affords no concealment: basal antennal joint perfectly free, legs long, with much flattened blade-like joints: rostrum trifid.].....								

Alliance 2. INACHOIDA. Antennæ with the basal joint flattened or concave on the ventral surface, and intimately fused with the surrounding parts, its antero-external angle produced to form a spine which is visible from above on either side of the rostrum. External maxillipeds with the merus as broad as or broader than the ischium, and with the palp small.

I. Rostrum simple: post-ocular spine small: basal antennal spine small or moderate.	1. Branchial regions upraised, and meeting across, and thus concealing, the cardiac region: 2nd pair of trunk-legs, in the adult, many times the length of the carapace.....	ENCEPHALOIDES
		INACHOIDES.
II. Rostrum bifid: post-ocular spine large: basal antennal spine large...	1. Eyes hardly retractile.....	APOCREMNUS.
	2. Eyes retractile against a strong post-ocular spine.....	COLLODES.



The chelipeds, though actually slender, are relatively to the carapace as stout and long as those of the longer-armed species of *Lambrus*: they are one-third longer than the combined carapace neck and rostrum: they are sub-cylindrical and spiny: their proportions are much those of *Lambrus*, the fingers being not much more than a quarter the length of the palm. The fingers are curved, and are in contact only at their tips.

The legs, which are very slender and are not quite so long as the chelipeds, display no remarkable characters.

The figure, which represents a male magnified two diameters, shows the proportions better than any table of measurements.

Loc. Port Blair, Andaman Islands.

ACHÆUS, Leach.

Achæus, Leach, Malac. Podophth. Brit., Tab. XXII. fig. C.

Achæus, Desmarest, Consid. Gen. Crust., p. 153.

Achæus, Milne-Edwards, Hist. Nat. Crust. I. 281.

Achæus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 643; and 'Challenger' Brachyura, p. 8.

Carapace triangular with the branchial regions swollen, always more or less constricted behind the eyes. Rostrum very short, bifid. Eye-stalks long and hardly retractile backwards: no orbits or post-ocular spine. Antennæ with the basal joint very slender, sub-cylindrical, the other joints and the flagellum completely exposed. External maxillipeds with the meropodite long, narrower than the ischiopodite, and carrying the next joint at, or near, its apex. Chelipeds short, not very stout. Legs slender, sometimes long and filiform: the dactyli of those of the last two pairs more or less falcate. Abdomen consisting of six segments in both sexes.

As Miers has remarked, this genus is distinguished from *Stenorhynchus* only by the form of the rostrum, which consists of two short lobes instead of two long spines.

Key to the Indian species of the genus Achæus.

- I. Carapace with a post-ocular constriction, but with no long post-ocular "neck": dactyli of last pair, or two pair, of legs strongly falciform:—
 1. Carapace and eye-stalks smooth ... *A. lacertosus*.
 2. Carapace with a bilobed prominence on the cardiac region: eye-stalks with a tubercle on the anterior surface:—
 - i. Gastric region smooth ... *A. affinis*.

- ii. Gastric region with a sharp tubercle or spine *A. spinosus*.
- II. Carapace with a long post-ocular neck: dactyli of last pair of legs hardly curved:—
 - 1. Lobes of rostrum with a spinate carina: median tubercles of carapace low and blunt ... *A. cadelli*.
 - 2. Lobes of rostrum with a smooth carina: median tubercles of carapace sharp and elevated *A. tenuicollis*.

Achæus tenuicollis, Miers.

Achæus tenuicollis, Miers 'Challenger' Brachyura, p. 9, Pl. I. fig. 3.

"The body is thinly clothed with short curled hairs; the limbs with similar hairs, interspersed among which are some longer ones. The carapace is subtriangulate, little longer than broad, with a neck-like constriction behind the orbits, and armed with spines as follows:—Three conical spines upon the gastric and another upon the cardiac region, two shorter conical spines or tubercles whereof the anterior is the smallest, on each branchial region, behind these one very small on the posterior margin of the carapace, and another on the sides of the branchial regions above the bases of the chelipedes; also a small spine upon the rounded, lateral, hepatic protuberance, and another behind this, on the pterygostomial region; there is also a strong spinule on the upper margin of the orbit, above the eye-peduncles. The lobes of the rostrum are short, and terminate each in a spine. The sternal surface of the body bears a few spinules. The post-abdomen of the male, is as usual, six-jointed (the two last joints having coalesced). The eye-peduncles are robust, with the corneæ protuberant; a small spinule exists on the inferior margin of the eye-peduncle, and another on the upper margin of the eye, near the distal extremity. The antennules are lodged in deep longitudinal fossettes; the very slender basal joint of the antennæ is joined with the front at its distal extremity and bears several small spinules on its inferior surface, the following joint is short, the next about as long as the basal joint, flagella slender; the ischium-joint of the outer maxillipedes is produced at its inner and distal angle which is rounded and bears several spinules on its outer surface, as does also the merus-joint which is rounded, not truncated, at the distal extremity where it bears the next joint. The chelipedes (in the male) are rather slender, and longer than the body; with the joints clothed with rather long hairs; ischium and merus-joints with a series of spinules on their antero- and postero-inferior faces, wrist about as long as palm, with a few spinules hardly discernible amid the hairs which clothe this joint,

palm slightly compressed, not dilated, armed with spinules on its upper and lower margins, fingers about as long as palm, and slightly incurved at the apices which are nearly destitute of hair; the ambulatory legs are very slender and elongated; the dactyli of the first three pairs are short and nearly straight, in the last pair only are they slightly falciform. Colour (in spirit) light yellowish-brown." (Miers).

A single specimen is included in the Museum collection: the locality is not quite certain, but it came most probably from the Andamans.

Achæus cadelli, n. sp. Plate V. fig. 1.

In general form and proportions much resembling *Achæus lorina* (Ad. & White), from which it differs in having the legs even more slender, and the eye-stalks quite smooth.

The regions of the pyriform carapace are well demarcated, the hepatic regions being each produced to form a strong sharp tooth. There are three elevations, arranged in triangle, on the gastric region, and two, side by side, on the cardiac region.

The rostrum has the usual *Achæus*-form, but each lobe is dorsally carinate, the carina being spinate or serrate.

Behind the rostrum is a long constricted "neck," more pronounced even than that of *A. tenuicollis* and *brevirostris*.

The chelipeds are of the usual form. The legs are extremely long and slender, those of the second trunk segment being about five times the length of the carapace, rostrum included. The dactyli of the 4th and 5th pairs are hardly falciform. Length of carapace, 7 millim.: greatest breadth of carapace, 4 millim.: length of 2nd pair of trunk-legs, 36.5 millim.

Loc. Andamans.

Achæus spinosus, Miers.

Achæus spinosus, Miers, Japanese and Korean Crustacea, in Proc. Zool. Soc., 1879, p. 25.

Carapace triangular, narrowed behind the eyes, and armed with six spines above, namely: one on the gastric, one—bilobed—on the cardiac, and two on each branchial region: there are also some spines or sharp tubercles on the ventrad aspect of the hepatic and branchial regions. The rostrum is small and bilobed. The eye-stalks are robust, and have a strong tubercle near the middle of the anterior surface. Chelipeds in the male robust, the arm and wrist granular above, the palm swollen, with about six spinules on the upper margin and a few granules on the lower margin near its base: fingers, in the male, acute

with a wide hiatus at base when closed, both with a strong tooth on their opposed margins near the base, and with the outer margins carinate. In the female the chelipeds differ only in being much less robust, and in having the fingers much more closely apposable and toothless. Ambulatory legs long and slender: the dactylus of the last pair strongly falcate.

[The basal antennal joint has one or two spines at its distal end, and the free portion of the antenna is much shorter than the carapace.]

Length of adult, 6 to 7 millim.

In the Museum collection, from the Persian Gulf. Ex coll. W. T. Blanford.

Achæus lacertosus, Stimpson.

Achæus lacertosus, Stimpson, Proc. Acad. Nat. Sci. Philad., 1857, p. 218.

Achæus breviceps, Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 433 (sec. Haswell).

Achæus lacertosus and *breviceps*, Haswell, Cat. Austr. Stalk and Sess. eyed Crust., p. 3.

Achæus lacertosus Miers, Zool. "Alert," pp. 181 and 188; and "Challenger" Brachyura, p. 8.

Achæus lacertosus, J. R. Henderson, Trans. Linn. Soc., Zool., 1893, p. 341.

Carapace triangular, with the regions fairly well delimited and the surface quite smooth beneath a slight pubescence: hepatic region with a horizontal laminar tooth. Rostrum as long as wide, bilobed. Antennæ filiform, the free portion longer than the carapace. Eye-stalks long, slender, smooth. Chelipeds much stouter than the other legs, the meropodite being the stoutest joint, and the hand being incurved and the fingers compressed. The ambulatory legs are long and slender, the first pair being more than three times the length of the carapace: the dactyli of the last two pairs are strongly falcate.

Length of adult about 6 millim.

In the Museum collection are numerous specimens from the Andamans, from Palk Straits, and from the Orissa Coast.

Achæus affinis, Miers.

Achæus affinis, Miers, Zoology of the 'Alert,' pp. 181 and 188, and "Challenger" Brachyura, p. 8.

Achæus affinis, de Man, Archiv. f. Naturges., LIII. 1887, p. 218.

Achæus affinis, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 341.

Achæus affinis, Ortmann, Zool. Forsch. in Austr. and Malay Arch., Jena, 1894, p. 37.

"Carapace subtriangular and moderately convex, with the surface uneven, but the regions not very distinctly defined; the post-orbital

region is constricted. The rostrum is moderately prominent, the frontal lobes very small and subacute. On the cardiac region is a bilobated prominence, which is usually very much elevated; there is a small angulated prominence on the hepatic regions, and occasionally one or two granules on the branchial regions, which are not at all convex. Eye-peduncles with a blunt tubercle in the middle of their anterior margins. The merus-joints of the outer maxillipedes are narrowed and subacute at their distal ends, where they are articulated with the next joints. The chelipedes (in both sexes) are rather slender; margins of the arm, wrist, and palm usually with a few granules or spinules; merus somewhat trigonous; fingers as long as the palm, and somewhat incurved, with their inner margins denticulated, and having between them when closed (in the males) a small hiatus at base. The ambulatory legs are slender, filiform, and very much elongated, the second legs being, in an adult male, four times as long as the postfrontal portion of the carapace; the dactyli of the two posterior pairs only are distinctly falciform; both chelipedes and ambulatory legs are scantily clothed with long hairs. Length of carapace (including rostrum) of an adult male about 5 lines (10·5 millim.), breadth about 3 lines (6 millim.); length of second leg about 1 inch 8 lines (42 millim.); an adult female has the carapace relatively somewhat broader, length nearly $5\frac{1}{2}$ lines (12 millim.), breadth 4 lines (8·5 millim.).

The bilobated prominence on the cardiac region and tuberculated eye-peduncles serve to distinguish this species." (Miers).

This species is included in the Indian Fauna on the authority of Professor Henderson: there are no specimens in the Indian Museum collection.

PARATYMOLUS, Miers.

Paratymolus, Miers, P. Z. S., 1879, p. 45.

Paratymolus, Haswell, Ann. Mag. Nat. Hist., 1880, Vol. V. p. 302; and Cat. Austr. Crust., p. 142.

Paratymolus, Ortmann, Zool. Jahrb. Syst., &c., VII. 1893-94, p. 34.

I agree with Ortmann in placing this genus among the *Achæus*-like Maiidæ: the position of the external genitalia of an ovigerous female in the Museum collection is conclusive.

Carapace elongate-subpentagonal, not depressed.

Eye-stalks long, slender, salient, non-retractile: no orbits or pre-ocular and post-ocular spines. Antennules longitudinally folded beneath the rostrum.

Antennæ long, exposed, dorsally, in the greater part of their extent: the basal joint slender, but so short as hardly to reach the front.

Rostrum short, emarginate, distinctly delimited from the carapace. Epistome short.

External maxillipeds with the merus narrower than the ischium, and bearing the flagellum at the antero-internal angle.

Legs not elongate: dactyli slender, straight.

Paratymolus hastatus, n. sp. Plate V. figs. 4, 4a.

Carapace somewhat elongate-pentagonal or ovoid, with the rostrum sharply demarcated, and with the regions undefined.

Gastric region with three sharp tubercles disposed in a triangle, base forwards: cardiac region with a single tubercle: branchial regions each surmounted by an oblique crest of 2 or 3, and with a lateral marginal row of 2 or 3, sharp tubercles: hepatic regions each with two sharp lateral teeth, the posterior of which is large. Rostrum short, emarginate, deeply and broadly grooved dorsally.

Eye-stalks long, laterally projecting, slightly moveable forwards but not retractile. Eyes tipped with two or three stiff setæ. No orbits, and nothing in the shape of orbital spines except a slight angular emargination of the base of the rostrum.

Antennæ as long as the post-orbital portion of the carapace, and visible, dorsally, from the base of the second joint of the peduncle: the basal joint, which alone is concealed, although slender is short, hardly reaching the front.

External maxillipeds with the merus broad, but not so broad as the ischium, and giving insertion to the palp at the antero-internal angle.

Trunk-legs with a few coarse stiff setæ: the 2nd pair, which are slightly the longest, are a little less than twice the length of the carapace without the rostrum.

Chelipeds characterized by the carpus, which has its antero-internal angle produced obliquely to form a great spike, the point of which reaches almost to the base of the fingers.

Length of carapace 6 millim. Breadth of carapace 4·5 millim. Length of 2nd pair of legs 10·5 millim.

An egg-laden female from the Andamans; in which I am satisfied that the genital orifices are not on the bases of the third pair of legs, but on the sternum.

PHYSACHÆUS, n. gen.

Closely allied to *Achæus*, from which it is distinguished chiefly by the form of the basal joint of the antennary peduncle, which is long and slender, and is fused near its distal end with the tip of the rostrum.

General form that of an *Achæus* with the pterygostomial and branchial regions so inflated as to push forwards the epistomial region to a plane almost at right angles with the antennary region.

Eyes small, slender, rigidly immovable,—in short undergoing degeneration. No orbits or orbital spines.

Rostrum very short, bifid, at tip, the point of each tooth being fused with the distal end of the (otherwise free) sub-cylindrical basal joint of the antennary peduncle. Antennæ of great length.

External maxillipeds with the merus rounded and slightly produced beyond the articulation—at the antero-internal angle—of the palp: the merus much narrower than the ischium. Legs long and slender, with long filamentous dactyli. Chelipeds short.

Physachæus ctenurus, n. sp. Plate III. figs. 2, 2 a-b.

Carapace sub-triangular, globosely inflated, with all the regions, except the cardiac, tumid and fairly well delimited, and with a strong post-ocular constriction, beneath which there is an almost vertical descent to the mouth.

The rostrum, which is small, consists of two narrow, slightly divergent, hollow teeth, to either apex of which the distal end of the otherwise perfectly free basal joint of the corresponding antennary peduncle is fused.

Two large erect procurved spines occur in the middle line of the carapace; one on the posterior part of the gastric region, the other behind the cardiac region: on either side of the former, but in a plane anterior to it, there may sometimes be a spinule.

In both sexes the abdomen is bluntly but strongly carinated down the middle line, the carina in the case of the male ending on the 6th tergum in a huge recurved spine: in the female instead of a spine there is a small tubercle, and the posterior edge of the sixth tergum bears a row of four spines.

The eye-stalks are very small, and are rigidly fixed at right angles to the rostrum: the corneæ are almost devoid of pigment. There are no orbits or orbital spines.

The antennæ are distinctly exposed from their base, and are half as long again as the entire carapace, between one-third and two-fifths of their extent being formed by the slender peduncle. The basal joint is slender and almost cylindrical: it is quite free from neighbouring parts, except at the distal end, which is fused with the tip of the rostrum. The flagella are fringed with long hairs.

The antennules are large, and fold longitudinally within the hollow teeth of the rostrum. Except in regard of the fingers, the chelipeds

have much the same form as, though slenderer proportions than, those of *Stenorhynchus*, but the merus is much more strongly and elegantly curved: the merus and carpus are moderately inflated, the former joint, like the ischium, having its lower edge more or less granulate: the palm is compressed, with the edges denticulate: the fingers are strongly compressed, and have the cutting edges accurately and completely appposable throughout, being denticulate near the tips only.

In the female the chelipeds have the same general form as in the male, but differ in having the lower edge of the ischium and merus strongly spinate. The legs are slender and filiform, about one-fourth of their length being contributed by the filamentous dactylus: those of the third trunk-segment are the longest, being about four times the length of the carapace, rostrum included, and more than two-and-a-half times the length of the chelipeds.

		Male.		Female.
Length of carapace	...	7.2 millim.	...	8.5 millim.
Breadth of carapace	...	6.0 "	...	7.0 "
Length of legs of 2nd trunk-segment		28.0 "	...	28.0 "
" " 3rd	" "	32.0 "	...	32.0 "

Numerous males and egg-laden females from the Andaman Sea, 240 to 375 fathoms.

The eggs are few in number and are singularly large, those from a female of the dimensions given above being over a millimetre in diameter.

Physachæus tonsor, n. sp. Plate III. fig. 3.

The female, which is the only sex represented in the collection, differs from the female of *Physachæus ctenurus* in the following particulars:—

(1) the gastric region of the carapace, instead of a single large spine, has several smooth tubercles; and the large spine behind the cardiac region is coarser, and is recurved instead of procurved: the post-ocular constriction is less marked:

(2) the abdominal carina ends in a spine, and the sixth tergum has its after edge perfectly smooth instead of quadrispinate:

(3) the eye-stalks are larger, and are compressed instead of cylindrical:

(4) the chelipeds are relatively stouter, being of much the same proportions as those of the male of *Physachæus ctenurus*: their merus is compressed and has its lower border very strongly and sharply carinated: the hands are much thinner and more compressed; the palm

having its lower edge, and the fingers their outside edges, sharply cristate:

(5) the legs of the second, not of the third, trunk-segment are the longest, and considerably so.

Length of carapace 11 millim. Breadth of carapace 9.5 millim. Length of legs of 2nd trunk-segment 47 millim., of 3rd trunk-segment 40 millim.

Two egg-laden females from the Andaman Sea, 271 fathoms.

The eggs, as in the preceding species, are large and few in number.

The above species represent an *Achæus* modified for life at a considerable depth. The branchial chambers, as is very commonly the case in deep-sea Malacostraca, are greatly inflated: the eyes have degenerated, and the antennæ—no doubt in compensation—have become remarkably lengthened: while the auditory tubercles also, it may be mentioned, are large and prominent.

GRYPACHÆUS, n. gen.

Intermediate between *Achæus* and *Echinoplax*.

Carapace triangular, spiny, separated from the frontal region by a post-ocular "neck." Rostrum spiny: composed of two short divergent spinelets, with a strong median deflexed (interantennular) spine, not visible from above. Eyes laterally projecting, movable, but not sufficiently retractile to be ever concealed. Small supra-ocular and post-ocular spines are present as part of the general spinature. Antennæ dorsally exposed from the basal joint of the peduncle, which joint is long slender cylindrical and spiny. External maxillipeds with the merus elongate, much narrower than the ischium, and not much broader than the carpopodite. Legs hairy and spiniferous. Abdomen six-jointed in ♀.

Grypachæus hyalinus (Alcock & Anderson). Plate III. figs. 4, 4a.

Achæus hyalinus, Alcock & Anderson, J. A. S. B., Pt. ii. 1894, p. 205.

Carapace sub-triangular, thin, vitreous, spiny especially in its anterior half: the regions well delimited, and the post-ocular portion constricted to form a "neck." The rostrum, as seen from above, ends in two short spines, each of which has a spine at its base; but from in front or from below it shows a strong vertically deflexed (interantennular) spine.

The eyes are large; and the long eye-stalks, which bear two tubercles on their front surface; are movable backwards, and are exposed from

their base in all positions. The antennæ are visible, dorsally, from the end of the basal joint of the peduncle, which joint is long, slender, cylindrical and spiny.

The external maxillipeds are large, hairy, and almost pediform, owing to the narrowness of the merus and the coarseness of the palp.

The trunk-legs are hairy and spiny, the hairs on the 2nd and 3rd pairs being remarkably long, stiff, and closely and evenly set. The arm, wrist, and hand of the chelipeds—but especially the arm—are acutely spiny, as are also the edges of the meropodites of the legs,—the spinature of the front edge of the meropodites of the 2nd and 3rd pairs being particularly prominent. The fifth pair of legs are sub-chelate, the propodite having its proximal end strongly dilated to receive the folded-back dactylus: the apposed edge of the dactylus is minutely, that of the propodite sharply and conspicuously, spinate.

Length of carapace 14 millim. Breadth of carapace 9 millim. Greatest span (between extended 2nd pair of trunk-legs) 67 millim.

Loc. Off Trincomalee 28 fms. Females only.

ECHINOPLAX, Miers.

Echinoplax, Miers, "Challenger" Brachyura, p. 31.

Carapace sub-pyriform, longer than broad, and covered with very numerous closely-set spines and spinules: orbital margin spinose: spines of rostrum acute, divergent from their bases, and bearing several accessory spinules. Post-abdomen seven-jointed. Basal antennal joint slender, spinuliferous, and in contact with the front at the distal extremity: flagellum visible from above at the sides of the rostrum. Maxillipeds with the merus narrower than the ischium, and the palp coarse; merus truncated and not notched at the distal extremity, the antero-lateral angle not produced. Legs spinuliferous: Chelipeds in the female [as in the male] slender and feeble, with the palms not dilated. Ambulatory legs considerably elongated, with the penultimate joint not dilated; the dactyli nearly straight.

Key to the Indian Species of Echinoplax.

Carapace with the regions well defined: rostrum in the adult considerably less than half the length of the carapace:—

1. Carapace and abdominal terga closely covered with pungent acicular spines of equal size... *E. pungens*.
2. Carapace and abdominal terga finely granular, with a few definitely placed spines of conspicuous size *E. rubida*.

Echinoplax pungens, Wood-Mason.

Echinoplax pungens, Wood-Mason, Ann. Mag. Nat. Hist., March, 1891, p. 259.

Carapace pyriform, convex, with the regions well delimited; densely covered, as are also the sterna, chelipeds, ambulatory legs, and external maxillipeds, with pungent acicular spines. The abdominal terga of the male and young female are also similarly spiny, but in the adult female they become only distantly and coarsely granular.

The rostrum consists of two slender curved divergent spines—less than one-third the length of the carapace proper—the outer and lower surfaces of which are extremely spiny.

The eye-stalks, which have the anterior surface closely spinulate, are retractile, but not to the extent of concealment: there is a strong post-ocular spine—to which, however, the retracted eye does not nearly reach—and numerous smaller spines along the supra-ocular and infra-ocular margins. The antennæ are visible from above, from the middle of the second joint of the peduncle: the peduncle is spiny, with all the joints very slender: the flagellum reaches a little beyond the tip of the rostrum.

The interantennular spine is large and deeply bifid.

The chelipeds, which are alike in form in both sexes—though relatively longer in the male—are not stouter than the ambulatory legs, and are rather longer than the carapace and rostrum.

The legs of the next pair are more than twice, and those of the third pair rather less than twice the length of the chelipeds, while the fourth and fifth pairs decrease considerably in length: the dactyli of all are densely covered with a brushwork of setæ.

	Male (adult).	Female (adult).
Length of carapace and rostrum ...	70 millim.	79 millim.
Greatest breadth of carapace ...	47 „	57 „
Length of cheliped ...	76 „	75 „
„ „ 2nd pair ...	158 „	191 „

Andaman Sea, 130–250 fathoms.

A figure of this fine species has been drawn for “Illustrations of the Zoology of the ‘Investigator’” for 1896.

Echinoplax rubida, n. sp.

Differs from *Echinoplax pungens*, specimens of the same sex, and of approximately the same size being compared, in the following particulars:—

1. The carapace, instead of being everywhere covered with pun-

gent acicular spines of uniform size, is finely granular, with certain definitely placed distant thornlike spines of conspicuous magnitude, namely :—four in triangle on the gastric region, two side by side on the cardiac region, two side by side on the intestinal region, three on each hepatic region, and three on each branchial region: besides these there are some smaller spines on the lateral aspect of the pterygostomian and branchial regions:

2. The rostral spines are less divergent, and have elegantly curved tips:

3. The abdominal terga (of the young female), instead of being everywhere closely covered with pungent spines, are merely finely and distantly granular, with a single large spine on the first tergum, and a pair of smaller spines on the second, in the middle line:

4. The legs are much less spiny, the propodites of the ambulatory legs being fringed with stiff bristles instead of spines:

5. The colour differs, being, in spirit specimens, a warm brown, instead of a pale yellow.

It differs from *Echinoplax moseleyi*, Miers, judging from the figures and description, in the following particulars:—

1. The regions of the carapace are well delimited by sharp cut grooves:

2. The rostral spines are considerably less than half the length of the carapace proper:

3. The armature is altogether different, the large stout spines of the present species standing out on a finely granular carapace, and the abdominal terga being distantly granular.

Total length of carapace 35 millim., breadth of carapace 21 millim., greatest span (2nd pair of trunk-legs) 150 millim.

Loc. Andaman Sea, 90 to 177 fathoms.

PLATYMAIA, Miers.

Platymaia, Miers, 'Challenger' Brachyura, p. 12.

Carapace sub-orbicular. Rostrum short, tridentate owing to the size and projection of the interantennular septum. No pre-ocular spine; but a post-ocular spine against which the eye is retractile, but which affords no concealment to the eye. Epistome extremely narrow. Eyes large, with short eye-stalks. Basal antennal joint short, cylindrical, and perfectly free: the flagellum and part of the peduncle visible from above.

External maxillipeds with the meropodite narrow, and bearing the next joint at its summit. Chelipeds in the male long, with a long in-

flated club-shaped palm: in the female very short and slender. Ambulatory legs long, with remarkably thin compressed joints: some of the legs spiny.

Abdomen in both sexes with all the segments separate.

This genus appears to be very closely related to *Macrocheira*.

Platymaia wyville-thomsoni, Miers.

Platymaia wyville-thomsoni, Miers, 'Challenger' Brachyura, p. 13, pl. ii. fig. 1.

Platymaia wyville-thomsoni, Wood-Mason and Alcock, Ann. Mag. Nat. Hist., March, 1891, p. 258, and May, 1894, p. 401.

Carapace transversely sub-circular with the cervical groove well defined: its surface ranging from spinate (in the young) to nearly smooth (in old adults). The rostrum, which is so short as not to break beyond the general outline, consists of three stout spines of equal size, the middle one being the horizontally projecting interantennular spine.

The hepatic region of the carapace bears (in the adult) a nearly vertically disposed row of three spines, against the upper one of which the eye is retractile.

The eye-stalks are short, and the eyes large and oval. The antennæ are about one-third the length of the carapace, and are plainly visible, in almost the whole of their extent, from above: the joints of the peduncle are short slender and cylindrical, the basal joint being perfectly free.

The external maxillipeds have the meropodite narrow (about half the breadth of the ischiopodite) and giving attachment to the coarse palp at the summit: both meropodite and ischiopodite are spiny.

The chelipeds vary considerably according to sex: in both sexes they are spiny up to the base of the fingers; but whereas in the female and young male they are much slenderer than any of the legs and are not longer than the carapace, in the adult male they are from two to three times the length of the carapace and are much stouter than any of the legs—especially as regards the palm, which is swollen and club-shaped. The 2nd to 5th pairs of legs are long and slender, with the joints thin and compressed, the propodites being blade-like. The 2nd pair, which are from $3\frac{3}{4}$ (female) to $5\frac{1}{2}$ (male) times the length of the carapace, are remarkable for their propodite and dactylus, the front edge of which bears a double comb of enormous spines, the posterior edge also being spinulate: both edges of the merus and carpus also are distantly spinulate. The 3rd and 4th pairs have the front edge of the merus distantly spinulate, and they, as well as the 5th pair, have the front edge of the razor-like merus closely fringed with long stiff hairs.

The abdomen in both sexes is seven-jointed, the abdominal terga, like the thoracic sterna, bearing a few spines or tubercles. The epimeral plates corresponding to the third and fourth trunk legs are also spinate.

Andaman Sea, 130-405 fathoms.

A large male of this fine species have been figured for "Illustrations of the Zoology of the 'Investigator'" for 1896.

Note on some obvious growth-changes in *Platymaia wyville-thomsoni*.

In very young specimens (carapace less than half an inch in diameter) the whole carapace is closely and sharply spiny.

In larger specimens (carapace about three-quarters of an inch in diameter) the carapace has become closely and finely granular, with the spines persistent only in definite situations, somewhat as in Miers' figure and description (*loc. cit.*)

In larger specimens (carapace two and a half inches in diameter) the carapace has become coarsely and bluntly granular, without any spines, except a few quite anteriorly in the neighbourhood of the hepatic region.

In the largest specimens (carapace three to nearly four inches in diameter) the carapace is in places quite smooth, the only spines present being two external to the eye, and one on the front margin of the hepatic region.

In contrast with the carapace, the spines on the abdominal sterna of the male show no signs of effacement with age.

The colours also vary with age. In young males the carapace is red, with or without white points, and the legs are red and white in alternate bands. In the adult the colour is uniform.

ONCINOPUS, de Haan.

Oncinopus, de Haan, Fauna Japonica, Crust., p. 87.

Oncinopus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 645; and 'Challenger' Brachyura, p. 20.

"Carapace semi-membranaceous, elongate, narrow-triangular and depressed. Rostrum very short, composed of two vertically compressed laminiform lobes: no præ- or post-ocular spines. Post-abdomen in both sexes distinctly seven-jointed. Eyes slender and projecting laterally. Antennæ with the basal joint very short and slender, and not attaining the front, the flagella exposed and visible at the sides of the rostrum. Merus of the exterior maxillipedes elongated, and articulated with the

next joint at its summit. Chelipeds in the male rather small, with the palm turgid, and the fingers having between them, when closed, an interspace at the base. Ambulatory legs slender and 'somewhat elongated, with the penultimate joints of the first and second pairs dilated, compressed, and ciliated on the posterior margin; the dactyli in all slightly arcuated and retractile against the penultimate joints.'

Oncinopus aranea, de Haan.

Inachus (Oncinopus) aranea, de H., Faun. Japon. Crust., p. 100, pl. xxix. fig. 2.

Oncinopus aranea, Adams and White, Zool. 'Samarang,' Crust., p. 3.

Oncinopus neptunus, Adams and White, Zool. 'Samarang,' Crust., p. 1, pl. ii. fig. 1.

Oncinopus subpellucidus, Stimpson, Proc. Acad. Nat. Sci. Philad., 1857, p. 221.

Oncinopus angulatus, Haswell, Proc. Linn. Soc., N. S. Wales, IV. 1879, p. 433.

Oncinopus subpellucidus, Haswell, Cat. Austr. Crust., p. 5.

Oncinopus aranea, Miers, Zool. 'Alert,' pp. 182 and 190; and 'Challenger' Brachyura, p. 20.

Oncinopus neptunus, Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109.

Oncinopus aranea, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 341.

Oncinopus aranea, Ortmann, Zool. Jahrb., Syst. etc., VII. 1893, p. 37.

Oncinopus neptunus, Alcock and Anderson, J. A. S. B., Pt. ii. 1894, p. 199.

Carapace elongate-triangular, thin and semi-membranous, and, as well as all the appendages, tomentose. Rostrum short, bilobed.

Eyes small, retractile beneath the edge of the carapace: no orbits or protective spines.

Antennæ extremely short, reaching only just beyond the tip of the rostrum: the basal joint short and free.

Chelipeds in the female and young male slenderer than the next legs and not quite equal in length to the carapace; in the adult male about as stout as the next legs, with an inflated almost globose palm, and a little longer than the carapace.

The 2nd and 3rd pair of legs differ very markedly from the 4th and 5th pair. The 2nd and 3rd pair are long and stout, with a comparatively short carpopodite, with a long broad propodite, and with a comparatively slightly curved dactylus—all these joints being remarkably setaceous. The 4th and 5th pair, on the other hand, are slender and comparatively short, with a long slender carpopodite and with a short propodite which with the strongly recurved dactylus forms a sub-chela—all these joints being merely tomentose. The 5th pair of legs is also remarkable for its sub-dorsal position.

Length of carapace of an adult, 14 to 15 millim.

Specimens in the Museum collection from the Laccadives, Maldives, Ceylon, Andamans and Malay Peninsula, up to 32 fms.

CAMPOSCIA, Latreille.

[*Camposcia*, Latreille, Cuvier Regne Animal (2) IV. p. 60.]

Camposcia, Milne-Edwards, Hist. Nat. Crust. I. 282.

Camposcia, de Haan, Fauna Japonica, Crust., p. 87.

Camposcia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 644.

Carapace pyriform. Rostrum broad, exceedingly short—hardly surpassing the level of attachment of the eyes—emarginate, slightly deflexed.

Eye-stalks long, recurved, retractile towards the sides of the carapace: a post-ocular tooth, not however affording any concealment to the eye. Antennular fossæ coalescent to form a single chamber. Antennæ moderately long, almost entirely exposed to dorsal view, the free joints of the peduncle flattened.

External maxillipeds with the merus narrower than the ischium, and giving attachment to the next joint at the summit. Chelipeds in both sexes slender—but most so in the female—and short. Some of the ambulatory legs long.

The abdomen in both sexes has all seven joints distinct, and is as broad in the adult male as it is in the adult female—covering almost the whole sternum.

Camposcia retusa, Latr.

[*Camposcia retusa*, Latreille, Cuvier Regne Animal (2) IV. p. 60.]

[*Camposcia retusa*, Guérin, Icon. Regn. Anim. Crust., pl. ix. fig. 1.]

Camposcia retusa, Latr. Milne-Edwards, Hist. Nat. Crust. I. 283, pl. xv. figs. 15 and 16.

Camposcia retusa, Cuvier, Regne Animal, Crust., pl. xxxii. fig. 1.

Camposcia retusa, Adams and White, Zool. 'Samarang,' Crust., p. 6.

Camposcia retusa, Bleeker, Recherches Crust. de l'Ind. Archipel., p. 7.

Camposcia retusa, Stimpson, Proc. Acad. Nat. Sci. Philad., 1857, p. 218.

Camposcia retusa, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 255.

Camposcia retusa, Brocchi, Ann. Sci. Nat. (6) II. 1875, Art. 2, p. 89, pl. xviii. fig. 156 (male appendages).

Camposcia retusa, Hilgendorf, Monatsber. Akad. Berl., 1878, p. 784.

Camposcia retusa, Haswell, Proc. Linn. Soc., N. S. Wales, IV. 1879, p. 433; and Cat. Austr. Stalk and Sessile-eyed Crust., p. 4.

Camposcia retusa, E. Nauck, Zeits. Wiss. Zool., xxxiv. 1880, p. 38 (gastric teeth).

Camposcia retusa, Miers, Zool. 'Alert,' pp. 181, 189, 516, and 520.

Camposcia retusa, De Man, Archiv. f. Naturgesch. LIII. 1887, Bd. i. p. 219.

Camposcia retusa, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl., XXIII. 1888–89, No. 4, p. 35.

Camposcia retusa, A. Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 35.

[*Camposcia retusa*, F. Müller, Verh. Ges. Basel, VIII. p. 473.]

Carapace pyriform, thin, but well calcified. The whole body and

most of the appendages thickly setaceous, and densely encrusted with sponges, zoophytes, algæ, etc. Rostrum broad, extremely short, somewhat deflexed, slightly emarginate.

Eye-stalks long, recurved, retractile to the sides of the carapace, and towards a slender acute post-ocular spine. Owing to the imperfection of the rostrum the interantennular spine is not developed, so that both the antennules fold into a common chamber.

The antennæ, which are completely exposed from the base of the 2nd joint, have the basal joint long and slender, and the free joints of the peduncle flat and densely setaceous.

The hairy external maxillipeds have the antero-internal angle of the ischium produced into a long narrow lobe, parallel to the narrow meropodite.

The chelipeds in both sexes are slender and are about equal in length to the carapace: in the male they are stouter than in the female, and also differ in having the palms inflated: the fingers in both sexes are closely apposable and are toothed throughout.

The other trunk-legs increase in length from the 2nd pair (which are a little longer than the chelipeds) to the 4th pair (which are twice as long as the chelipeds): the 5th pair, again, being only as long as the 3rd pair.

The abdomen in the adults of both sexes is broad and sub-circular, almost entirely covering the sternum, and consists of seven separate segments.

In the Museum collection are adult males and egg-laden females from the Andamans, Cocos, Ceylon and Samoa—the last being from the collection of the Museum Godeffroy.

ALLIANCE II. INACHOIDA.

INACHOIDES, Edw. & Lucas.

Inachoides, Milne-Edwards and Lucas, in D'Orbigny Voy. Amer. Merid., Crust. pp. 4 & 5.

Inachoides, Miers, Journ. Linn. Soc., Zool., Vol. XIV. p. 646.

Inachoides, A. Milne-Edwards, Miss. Sci. Mex., etc., Crust., etc., I. p. 198.

Carapace pyriform much narrowed in front, inflated behind, the regions well delimited. Rostrum simple. Eyes not, or slightly, retractile towards the sides of the carapace; never, in any position, concealed. Pre-ocular and post-ocular spines distinct—especially the latter.

Basal antennal joint long and slender: its antero-external angle visible from above, on either side of the rostrum, as an acute spine:

the rest of the antennal peduncle, and the flagellum, completely exposed from above.

Epistome broad. External maxillipeds with the merus as broad as the ischium, completely closing the mouth.

Chelipeds in the male rather longer than any of the other legs, and with a long somewhat inflated palm. Ambulatory legs of moderate length, slender, and ending in a styliform dactylus which in some cases is spinulate along the posterior border.

Abdomen of the male composed of seven distinct segments, that of the female of five.

Inachoides dolichorhynchus, Alcock & Anderson. Plate IV. figs. 1, 1a.

Inachoides dolichorhynchus, Alcock and Anderson: Journ. As. Soc., Bengal, Pt. ii. 1894, p. 206.

Carapace elongate-triangular. Rostrum as long as the carapace, simple, spiny, acute. The regions of the carapace are well defined, and are distantly spiny, the following spines being the most conspicuous:— (1) on each side a supra-ocular, a post-ocular (hepatic), and four branchial; (2) in the middle line, a gastric, a cardiac, and an intestinal.

The eyes, though to a certain extent retractile towards the sides of the carapace, are in all positions completely exposed.

The antennæ, which are exposed from the end of the basal joint, are long—more than three-fourths the length of the carapace: their basal joint is long, slender, flattened and fused with the neighbouring parts, and has its antero-external angle produced into an acute spine: the second and third joints are knobbed distally.

The chelipeds are long—one-fourth longer than the carapace and rostrum combined: their palm, which forms about two-fifths of their total extent and is nearly three times the length of the fingers, is broadened and moderately inflated. The 2nd pair of trunk-legs are about equal in length to the chelipeds, but the 4th and 5th pairs are not much more than half that length.

Length of carapace and rostrum 17·5 millim.; greatest breadth 8 millim.; greatest span 54 millim.

Off Madras Coast.

ENCEPHALOIDES, Wood-Mason.

Nearly related to *Inachoides*.

Carapace, owing to the remarkable inflation of the branchial regions, heart-shaped and posteriorly as broad as long (rostrum included): the branchial regions meeting across the carapace in the middle line. Ros-

trum simple, shaped like the beak of a bird. Eyes retractile against the sides of the carapace: a small pre-ocular and post-ocular spine, but no definite orbit.

Basal antennal joint slender throughout: the antennæ visible, dorsally, from the base of the second joint.

Merus of the external maxillipeds produced antero-externally to form a foliaceous lobe which covers the greatly produced efferent branchial orifice.

Abdomen in the male seven-jointed: in the female the fourth, fifth and sixth segments, though distinctly recognizable, are firmly fused together.

Chelipeds in both sexes slender. Legs long and slender.

Only eight branchiæ on either side.

Encephaloides armstrongi, Wood-Mason.

Encephaloides armstrongi, Wood-Mason, Ann. Mag. Nat. Hist., March, 1891 p. 259.

Carapace heartshaped: its greatest breadth is equal to its length with the rostrum: its surface in the adult is nodular or pustular, in the young coarsely spiny. The gastric and hepatic regions are well-defined; but the cardiac and intestinal regions are entirely concealed by the branchial regions, which rise up like a pair of mammæ, and meet, but without any fusion of walls, down the middle line.

The rostrum, which is shaped exactly like the beak of a bird, is about one-fourth the length of the carapace proper, and has a finely serrated edge.

In the male the abdomen is distinctly seven-jointed; but in the female the fourth, fifth and sixth segments are immovably sutured together.

The eyes which are small, slender, and unpigmented, are retractile against the side of the carapace: there is a very narrow supra-orbital cave ending anteriorly in a minute tooth, and there is a small post-ocular spinule.

On the dorsal aspect the antennæ are plainly visible on either side of the rostrum, from the base of the 2nd joint of the peduncle: the flagella, which are of hairlike tenuity, hardly surpass the tip of the rostrum.

Owing to the prolongation of the efferent branchial canal, the front edge of the buccal frame is V-shaped, and the merus of the external maxillipeds ear-shaped.

The trunk-legs recall those of *Egeria*, being all long, slender, cylindrical, and quite devoid of hairs or spines: the chelipeds are short, and are not stouter than the ambulatory legs.

For proportions, see Ann. Mag. Nat. Hist., March, 1891, p. 260.

APOCREMNUS, A. Milne-Edwards.

Apocremnus, A. Milne-Edwards, Miss. Sci. Mex., etc., Crust., etc., I. p. 184.

Apocremnus, Miers, 'Challenger' Brachyura, p. 17.

Carapace triangular or pyriform, much narrowed in front, inflated behind. Rostrum bifid. Eyes imperfectly retractile: a strong supra-ocular, but no post-ocular spine [a distant hepatic spine must not be mistaken for a post-ocular spine]. Basal antennal joint narrow, its antero-external angle forming a strong spine visible from above on either side of the rostrum: the free joints of the peduncle and the flagellum exposed to dorsal view. Epistome broad. External maxillipeds with the merus at least as broad as the ischium, quite closing the mouth-frame. Chelipeds not much enlarged: the other legs short and slender, with slender dactyli capable of some flexion on the penultimate joint. Abdomen in the male six jointed—(in the female four (?) jointed).

The genus *Apocremnus* has never yet been reported from Eastern Seas. It was first described from the Florida coast, and was afterwards reported by the 'Challenger' from Fernando Noronha (an island in the South Atlantic, off the coast of Brazil). There is nothing unprecedented therefore in its occurrence in deepish water in the Indian Ocean.

Apocremnus indicus, n. sp. Plate IV. figs. 2, 2a.

Carapace pyriform, inflated in the branchial, constricted in the post-ocular region, and armed with six long knob-headed spines, as follows:—one, semi-erect, above the root of either eye-stalk; one in the middle of the cardiac region, flanked on either side by one in the middle of each branchial region; one in the middle line on the posterior border. There are, in addition, on either side, two sharp spines, one above the other, near the middle of the hepatic region, and far from the eye.

The rostrum is formed of two short, slightly divergent, knob-headed spines. On either side of its base are seen the antennæ and a large spine formed by the antero-external angle of the basal antennal joint.

The constituent segments of the sternum are sharply granular, and are separated from one another by deep grooves.

The eye-stalks are of moderate length, salient, and almost immovable.

The buccal orifice is large, and the external maxillipeds are ornamented with lines of fine sharp-cut granulation: their merus is as broad as the ischium, and is excavated near the middle for the insertion of the palp. The chelipeds, in the male, are somewhat longer than the carapace and rostrum: their ischium, merus, and carpus are ornamented with lines of fine sharp granulation: the palms are elongate and compressed, with the edges carinate: the fingers, which are less than half the length of the palm, are compressed and curved.

The ambulatory legs, which decrease in length gradually, have their bases and meropodites granular, and the dactyli very slender.

The length of the carapace of the largest specimen—a male—is 9 millim., of an egg-laden female 6 millim.

From off the Andamans at about 100 fathoms, and off Ceylon at 32 to 34 fathoms.

COLLODES, Stimpson.

Collodes, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. VII. 1862, p. 193.

Collodes, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 645.

Carapace ovate-triangular. Rostrum short, bifid, with the lobes approximate. Eyes of moderate length, retractile against a strong post-ocular process which affords no concealment. Basal antennal joint narrow, a little curved, anteriorly bidentate, one tooth placed behind the other; mobile part of the antennæ exposed. External maxillipeds with the merus as broad as the ischium, completely covering the mouth. Chelipeds of moderate size. Ambulatory legs short, prehensile, with slender dactyli which in length are equal to their propodites, and are retractile against the latter. Abdomen of the female consisting of five segments.

Collodes malabaricus, n. sp. Plate V. fig. 3.

Carapace ovate-triangular, with the gastric and cardiac regions distinct and elevated. Rostrum short, emarginate. Pre-ocular spine large and coarse, post-ocular spine very prominent. A tubercle on the cardiac region, and a large epibranchial spine on either side of it.

Basal antennal joint narrow throughout, and bearing two spines anteriorly—one at the antero-external angle, visible from above, and comparable in size to one of the rostral teeth—and one behind this, immediately in front of the base of the eye-stalk. Eyes slender and

retractile towards the post-ocular tooth, which, however, affords no concealment.

Chelipeds (in the female) hardly stouter than the ambulatory legs, which are short, with prehensile dactyli.

Two ovigerous females, the larger of which is 4 millim. long, from off the Malabar Coast, 26 to 31 fathoms.

The genus *Collodes* has hitherto been known only as a tropical American genus. It has been found on both sides of Central America so that its occurrence in Indian waters is not without precedent.

Sub-family II. ACANTHONYCHINÆ.

Eyes without true orbits: eye-stalks little movable, either short and more or less concealed beneath a forwardly-directed supra-ocular spine, or obsolescent and almost or completely sunk either in the sides of a huge beak-like rostrum, or between low pre-ocular and post-ocular excrescences (*Sphenocarcinus*): a distinct post-ocular spine, which is not cupped, may be present (*Pugettia*). Basal antennal joint truncate-triangular.

External maxillipeds with the merus as broad as the ischium, and with the (small) palp arising from the antero-internal angle of the merus.

Dactyli of the ambulatory legs prehensile or sub-chelate, in the former case the last three pairs of legs are often disproportionately short compared with the second pair. Rostrum either simple or two-spined.

Key to the Indian genera.

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|--|---|--|---|--|-----------------|
| I. Rostrum of huge size; simple, or bifid at tip; not flanked on either side by salient supra-ocular spines. | { | 1. Eye-stalks almost obsolete, completely sunk, and almost or quite immovable: | { | i. Carapace and rostrum sub-cylindrical, the latter bifid at tip..... | XENOCARCINUS. |
| | | carapace smooth or tuberculate: no post-ocular process. | | ii. Carapace depressed, elongate-triangular: rostrum laterally compressed, not bifid at tip..... |  | SIMOCARCINUS. |
| | { | 2. Eye-stalks short, sunken but movable between low smooth pre-ocular and post-ocular excrescences: carapace with huge symmetrical pedicled tablets..... | | | SPHENOCARCINUS. |

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|--|--|--|
| II. Rostrum flanked on either side by salient supra-ocular spines; either long and simple, or consisting of two spines of moderate length: no post-ocular process. | 1. Carapace elongate-triangular, rostrum elongate, simple: ambulatory legs not subchelate. | i. Rostrum laterally compressed, supra-ocular spines small: eye-stalks so short and deeply sunken as to hardly reach to the sides of the carapace; carapace of the female with large foliaceous lateral lobes..... HUENIA. |
| | 2. Carapace broad, sub-quadrangular: rostrum short and deeply bifid, ambulatory legs subchelate..... | ii. Rostrum horizontally compressed, supra-ocular spines large: eye-stalks short, but reaching beyond the sides of the carapace: carapace of the female without foliaceous lobes..... MENETHIUS.

ACANTHONYX. |

XENOCARCINUS, White.

Xenocarcinus, White, Jukes' Voyage H. M. S. 'Fly,' Vol. II. p. 335.

Huenioides, A. Milne-Edwards, Ann. Soc. Entomol. France (4) V. 1865, p. 144.

Xenocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 648, pl. xii. fig. 5.

Carapace ovate-subcylindrical, tapering to a long thick subcylindrical rostrum, or beak, the tip of which is emarginate or bifid.

Eyes short, completely sunken in the sides of the rostrum, almost immovable: no præ-ocular or post-ocular spines.

Antennæ with the basal joint triangular, and with the short mobile portion hidden beneath the rostrum.

External maxillipeds with the merus as broad as the ischium and giving attachment to the palp at its antero-internal angle.

Chelipeds not much shorter or stouter than the 2nd and 3rd pairs of legs: 4th and 5th pairs of legs short: all with the dactyli short, stout, curved, and sharply toothed along the posterior surface.

Abdomen of the female four-jointed, the 3rd—6th segments being fused together.

Xenocarcinus tuberculatus, White.

Xenocarcinus tuberculatus, White, P. Z. S., 1847, p. 119, and Ann. Mag. Nat. Hist. (2) I., 1848, p. 221, and in Jukes' Voyage H. M. S. 'Fly,' Vol. II. p. 336.

Xenocarcinus tuberculatus, Hess, Archiv. f. Naturges. XXXI. i. 1865, pp. 131 and 171.

Xenocarcinus tuberculatus, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 253, pl. xii. fig. 1.

Xenocarcinus tuberculatus, Miers, Zool. 'Erebus' and 'Terror,' Crust., p. 1, pl. ii. fig. 1, 1e.

Xenocarcinus tuberculatus, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 436, and Cat. Austr. Crust., p. 8.

Xenocarcinus tuberculatus, Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 40.

Carapace elongate ovate-subcylindrical with the regions ill defined and the surface more or less tuberculated. [Typically the tubercles fall into distinct transverse rows]. The rostrum has the form of a long coarse cylindrical beak, the apex of which is bifid, and the surface densely covered with velvety hairs.

The eyes are completely and almost immovably sunk in the sides of the rostrum.

The antennary flagella are much shorter than, and are completely hidden by, the rostrum.

The chelipeds and ambulatory legs are short and nodular, the latter having curved strongly-toothed prehensile dactyli. The chelipeds are hardly stouter, and are not much shorter, than the 2nd pair of legs, which again are much longer than the 3rd to 5th pair. The colours described by White are "two or three waved longitudinal red lines on the posterior half of the carapace, the inner line continued before the eyes." By A. Milne-Edwards the colours of the carapace and legs are said to be reddish stained with yellow.

In a good spirit specimen the abdomen carapace and beak are dull reddish brown, with a broad yellow stripe extending from the base of the beak to the tip of the abdomen, and on either side of the carapace a narrow sinuous yellow line; and the trunk-legs are yellow, more or less banded and striped with dull brown.

In the Museum collection are two females, one from Ceylon (34 fathoms), the other from the Andamans. The one from Ceylon, which is an egg-laden adult 15 millim. long, resembles as to its carapace and rostrum, but not as to its legs, the figure in the Zoology of the 'Erebus' and 'Terror;' and as to its legs, but not as to its carapace and rostrum, the figure in Archiv. du Mus. tom. VIII. 1872. The other, from the Andamans, which is not adult, exactly resembles, as to its carapace, but not as to its legs, the last cited figure.

SPHENOCARCINUS, A. Milne-Edwards.

Sphenocarcinus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I., p. 135.

Sphenocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 663; and 'Challenger' Brachyura, p. 34.

Carapace elongate sub-pentagonal, broad behind, tapering in front to a long rostrum formed of two spines (fused together to near the tip). The surface of the carapace is symmetrically and deeply honey-combed by broad deep channels which leave symmetrical tubercles with overhanging edges between them.

There are no true pre-ocular and post-ocular spines, but the eye is deeply sunk between two low smooth excrescences which are pre-ocular and post-ocular in position.

The basal antennal joint is truncate-triangular, and the antennary flagella are completely hidden beneath the rostrum. The epistome is long and narrow. The external maxillipeds have the merus as broad as the ischium, somewhat dilated at the antero-external angle, and somewhat excavated at the antero-internal angle for the insertion of the small palp. The chelipeds are not much stouter, and not much shorter than the next pair of legs, which are the longest: the dactyli of the legs, though stout recurved and prehensile, are not toothed along the posterior edge. Abdomen, in both sexes, seven-jointed.

Oxypleurodon Miers ('Challenger' Brachyura, p. 38) differs from *Sphenocarcinus* only in the form of the rostrum, the spines of which are divergent instead of convergent and more or less fused. I much suspect the generic value of this character. If, however, the two forms be identical, then *Sphenocarcinus* would have to be removed to the next sub-family, in which case the sub-family Acanthonychinae would be perfectly homogeneous.

Sphenocarcinus cuneus (Wood-Mason).

Oxypleurodon cuneus, Wood-Mason, Ann. Mag. Nat. Hist., (6) VII. 1891, p. 261.

Carapace elongate sub-pentagonal, narrowing to a long tapering cylindrical rostrum, which, in the male, is longer than the carapace and only emarginate at the extreme tip, but, in the female, is shorter than the carapace and distinctly bifid at the end.

The carapace is symmetrically honey-combed by deep channels, which leave between them great symmetrically undermined islets, as follows:—one, very elongate-oval, on the gastric region; one, triangular, on the cardiac region; one, somewhat semilunar with one horn

much produced laterally, on each branchial region; and one, Cupid's bow-shaped, along the posterior border. Besides these there are some smaller islet-like excrescences, namely, on each side, a supra-ocular, post-ocular, hepatic, and branchial.

Between the supra and post-ocular excrescences, are set the small squat little-movable eyes.

Of the trunk-legs, the 2nd pair (*i.e.*, first ambulatory legs) are the longest, being very slightly longer than the chelipeds, and considerably shorter than the carapace measured with the rostrum, but much longer than any of the last 3 pairs of legs.

In the female all the long joints, except the dactyli, and in the male all except the dactyli and propodites, are strongly carinated dorsally.

The chelipeds are hardly stouter than the next pair of legs, except as regards the palm in the male, which is broadened and somewhat inflated. In neither sex are the short white polished fingers appposable throughout.

	Male.		Female.	
Length of carapace and rostrum	...	19' millim.	...	18'5 millim.
Greatest breadth of carapace	...	12' "	...	13' "
Length of rostrum alone	...	10'5 "	...	8'7 "
" of 2nd pair of trunk-legs	...	15'5 "	...	15' "
<i>Loc.</i> Andaman Sea, 161 to 250 fathoms.				

This extremely elegant species has been figured for next year's issue of "Illustrations of the Zoology of the 'Investigator.'"

HUENIA, de Haan.

Huenia, de Haan, Faun. Japon. Crust., p. 83

Huenia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 648; and 'Challenger' Brachyura, p. 34.

Carapace depressed, elongate-triangular in the male,* with the lateral epibranchial angles produced; sub-quadrangular in the female, with two large foliaceous lobes (epibranchial and hepatic) on either side: a small pre-ocular, but no post-ocular spine. Rostrum simple, acute, vertically deep, laterally compressed. Abdomen in the male seven-jointed; in the female five-jointed; with the fourth to the sixth joints coalescent.

Eyes very small and almost immobile.

* A small hepatic lobe is sometimes present in the male also, on either side.

Basal antennal joint somewhat enlarged, and coalescent at its distal extremity with the front; beneath which the flagella are inserted out of sight in a dorsal view.

The external maxillipeds are small, the merus distally truncated, and bearing the palp at its antero-internal angle. Chelipeds in the male moderately developed, with the palms compressed and cristate above, the fingers somewhat excavated at the tips, and not apposable throughout their extent. Ambulatory legs short—the longest pair not much longer than the chelipeds, dactyli short, stout, strongly recurved, and more or less toothed along the posterior margin.

Huenia proteus, de Haan.

Maja (*Huenia*) *proteus*, de Haan, Faun. Japon. Crust., p. 95, pl. xxiii. figs. 4–6.

Huenia proteus, Adams and White, 'Samarang' Crustacea, p. 21, pl. iv. figs. 4–7, and p. 22, pl. iv. fig. 5.

Huenia proteus, Haswell, Proc. L. S., N. S. Wales, Vol. IV. 1879, p. 437; and Cat. Austr. Crust., p. 9.

Huenia proteus, Miers, Zool. 'Alert,' pp. 182 and 191, and 'Challenger' Brachyura, p. 35.

Huenia proteus, C. W. S. Aurivillius, Kongl. Svensk. Vet. Akad. Handl. XXIII. 1888–89, No. 4, p. 40, pl. iii. fig. 3.

Huenia proteus, R. I. Pocock, Ann. Mag. Nat. Hist. (6) V. 1890, p. 79.

Huenia proteus, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 341

Huenia proteus, Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 40.

Carapace flat, depressed, with two low elevations in the middle line, otherwise smooth: in the male the carapace is elongate triangular, with the lateral epibranchial angles produced to form small lobes, and sometimes with the hepatic regions expanded in the same way: in the female the carapace is quadrilobate, owing to the foliaceous extension of the hepatic and epibranchial angles. Rostrum long, simple, acute, deep, and laterally compressed. Supra-ocular spines small. Eyes small, deeply sunk beneath the pre-ocular spine, almost immovable.

In the male the chelipeds are somewhat shorter, and the next pair of legs (which are the longest) are somewhat longer than the carapace and rostrum combined: in the female the chelipeds are considerably shorter than, and the next pair of legs are about the same length as, the carapace and rostrum. In the female and young male the fingers, which are closely toothed, meet throughout the greater part of their extent: in the male they meet only at the tips.

The last three pairs of legs are very short. All the long joints, except the dactyli, of all the trunk-legs are more or less carinate dorsally (anteriorly), the carination often being more or less discontinuous in the case of the chelipeds: the dactyli of the ambulatory legs are stout, strongly recurved, and more or less toothed along the posterior margin.

In the Museum collection there are several females, but only two males, from various parts of the Andamans, up to 20 fathoms.

SIMOCARCINUS, Miers.

Simocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 649.

As *Huenia*, but without the supra-ocular spine; with the chelipeds much stouter, especially as to the palm, which is much inflated; and with the ambulatory legs more cylindrical.

Simocarcinus pyramidatus (Heller).

Huenia pyramidata, Heller, Crust. Roth. Meer., in SB. Akad. Wien XLIII. 1861 p. 307, pl. i. fig. 9.

Description of the Male.

Carapace elongate-triangular, narrowing to a huge, deep, laterally compressed rostrum of greater length than the carapace: the hepatic regions are marked by a faint bulge, and the lateral epibranchial angles are very sharp cut, while the limits of the posterior border are bounded on either side by a small lobule. Except for a somewhat elongate eminence on the gastric region and a tubercle on the posterior cardiac region, the carapace is perfectly smooth.

The eyes are deeply sunk, and nearly immobile, and the cornea is somewhat deficient in pigment.

The chelipeds, which are markedly stouter than the other legs, are a little shorter than the carapace and rostrum; and the next pair of legs, which are a good deal more than twice the length of the 3rd pair and than thrice the length of the 5th pair, are equal in length to the carapace and rostrum. The palms are broadly inflated; and the fingers, which are strongly arched, meet only at the tips.

The ambulatory legs are cylindrical, and their dactyli are stout, strongly recurved, and toothed along the posterior margin.

Our single perfect specimen—a male from the Nicobars—measures 30 millim. in length of carapace and rostrum.

Simocarcinus simplex (Dana).

Huenia simplex and *brevirostrata*, Dana, U. S. Expl. Exp. Crust. I. pp. 133 and 134, pl. vi. figs. 3a-c, 4a-c.

Simocarcinus simplex, Miers, Jour. Linn. Soc., Zool., Vol. XIV. 1879, p. 649; and 'Challenger' Brachyura, p. 35 (*ubi synonym.*).

[*Simocarcinus simplex*, Cano, Boll. Soc. Nat. Napol. III. 1889, p. 173.]

Simocarcinus simplex, J. R. Henderson, Tr. Linn. Soc. Zool. (2) V. 1893, p. 342.

This species is distinguished from *Simocarcinus pyramidatus* (Hell.) (1) by the much shorter rostrum of the male; (2) by the presence of

three tubercles, disposed in a triangle, on the gastric region; (3) by the larger and more prominent eyes; (4) by the absence of the lobule on either side of the posterior border of the carapace; (5) by the much more massive chelipeds of the male.

This species is included in the Indian Fauna on the authority of Prof. J. R. Henderson. There are no specimens in the Indian Museum.

MENÆTHIUS, Edw.

Menæthius, Milne-Edwards, Hist. Nat. Crust. I. 338.

Menæthius, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 649; and 'Challenger' Brachyura, p. 36.

Carapace subpyriform, moderately convex, and tuberculated on the dorsal surface, with a large triangulate præ-ocular spine, but no post-ocular spine. Rostrum simple, slender, acute, or emarginate at apex. Post-abdomen in the male seven-jointed, in the female usually five-jointed, the penultimate joint formed by the coalescence of three segments. Eyes small, mobile, but not perfectly retractile. Basal antennal joint slightly wider at the base than at the distal extremity, which is unarmed; flagellum exposed and visible from above at the side of the rostrum. Merus of the exterior maxillipedes truncated at the distal extremity and with a prominent antero-external angle, and slightly notched at the antero-internal angle where it is articulated with the next joint. Chelipedes (in the male) well developed, with the palm slightly compressed; fingers acute, and having between them, when closed, an interspace at the base. Ambulatory legs of moderate length; the joints subcylindrical, not dilated or compressed; dactyli slightly curved and partially retractile. (Miers).

Menæthius monoceros, (Latr.) Edw.

[*Pisa monoceros*, Latr., Encycl. X. 139.]

Inachus arabicus, Rüppell, Krab. Roth. Meer., p. 24, pl. v. fig. 4.

Menæthius monoceros, Milne-Edwards, Hist. Nat. Crust., Vol. I. p. 339.

Menæthius suberratus, *porcellus*, and *tuberculatus*, Adams and White, 'Samarang' Crustacea, pp. 18 and 19, pl. iv. figs. 1 and 2.

Menæthius angustus, *depressus*, *suberratus*, *tuberculatus*, *areolatus* and *inornatus*, Dana, U. S. Expl. Exped., Crust. I. pp. 121-125, pl. iv. figs. 5a-7g, and pl. v. figs. 1a-3d.

Menæthius suberratus, *dentatus* and *depressus*, Stimpson, Proc. Ac. Nat. Sci. Philad., 1857, p. 219.

Menæthius monoceros, Heller, Crust. Roth. Meer., SB. AK. Wien, XLIII. 1861, p. 306.

Menæthius monoceros, A. Milne-Edwards in Maillard's L'île Réunion, Annexe F, p. 6; and *rugosus* p. 7, pl. xvii. fig. 2.

MENÆTHIUS MONOCEROS, A. MILNE-EDWARDS, NOUVELLES ARCHIVES DU MUSÉUM IV. 1868, p. 70, and VIII. 1872, pp. 252 and 253 (UBI. SYNON.)

Menæthius monoceros, Miers, Phil. Trans. Vol. 168, 1879, p. 485, and Zoology 'Alert,' pp. 182, 190, 517 and 521, and 'Challenger' Brachyura, p. 37.

Menæthius monoceros, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 437, and Cat. Austr. Crust., p. 9.

Menæthius monoceros, de Man, Notes Leyden Mus. II. 1880, p. 171, and Archiv. f. Naturges. LIII. 1887, i. 219.

Menæthius monoceros, Richters in Möbius Meeresf. Mauritius, p. 145.

[*Menæthius monoceros*, Cano. Boll. Soc. Nat. Napol. III. 1889, p. 175.]

Menæthius monoceros, Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 342.

Menæthius monoceros, Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 41.

Carapace elongate-triangular, most markedly so in the male, the lateral epibranchial angles sharp-cut, and the surface very variably tuberculated.

The rostrum, which is flanked on either side by the forwardly-directed supra-ocular spine, is styliiform, acute, and horizontally compressed, its length being about half that of the carapace in the male, but a good deal less in the female.

The small eyes are imperfectly retractile, and project freely from beneath the supra-ocular spine.

The chelipeds in the male are as long as, or a little longer than, the 2nd pair of legs, or about equal in length to the carapace and rostrum: they are very much stouter than any of the other legs, and have a somewhat inflated palm, and fingers which meet only at the tips.

The chelipeds in the female are not stouter than the other legs, and are considerably shorter than the next pair of legs, which, again, are a good deal shorter than the carapace and rostrum: the fingers meet through the greater part of their extent.

The 3rd-5th pair of legs are very much shorter than the 2nd pair: in all the dactyli are strongly recurved and are toothed along the posterior margin.

Very numerous specimens from the Andamans and Nicobars.

ACANTHONYX, Latr.

[*Acanthonyx*, Latreille, Regne Animal, (2) IV. 58.]

Acanthonyx, Milne-Edwards, Hist. Nat. Crust. I. 342.

Acanthonyx, A. Milne-Edwards, Miss. Sci. Mex., Crust. I. 142.

Acanthonyx, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 650; and 'Challenger' Brachyura, p. 42.

Carapace sub-oblong, rounded behind, and with the dorsal surface usually depressed, not markedly constricted behind the prominent antero-lateral angles, the lateral branchial spines small and not prominent. Præ-ocular spine prominent, acute. Spines of the rostrum united at the base, acute and but little divergent. Post-abdomen in the male six-jointed. Eyes small, mobile, but not completely retractile. Basal an-

tennal joint narrowing slightly from the base to the distal extremity, which is unarmed; flagellum exposed and visible from above at the side of the rostrum. Merus of the exterior maxillipeds truncated at the distal extremity and but slightly notched at the antero-internal angle, where it is articulated with the next joint. Chelipeds (in the adult male) well developed; palm compressed, but slightly turgid in the middle, and often slightly carinated above; fingers acute, and having between them, when closed, an interspace at the base. Ambulatory legs short, with the penultimate joints more or less dilated and compressed and armed with a tooth or lobe on its inferior margin, against which the small acute dactylus closes. (Miers).

Acanthonyx macleayi, Krauss.

Acanthonyx macleayi, Krauss, Sudafrikan. Crust., p. 47, pl. iii. fig. 6.

Acanthonyx macleayi, Miers, 'Challenger' Brachyura, p. 43.

Carapace sub-quadrangular, with the hepatic and lateral branchial spines well developed: these spines, as well as the spines of the rostrum and the carapace immediately behind the rostrum, are tufted with setæ; and on the gastric region in a line with the hepatic spines are two elevated tufts of setæ. Except for the spines and elevations above-mentioned, and for a slight median elevation in its posterior half, the carapace, both as to its margins and as to its surface, is perfectly smooth and unarmed.

The supra-ocular spines are parallel with, and in the female almost comparable in size with the rostral spines.

The chelipeds in the male, but not in the female, are much stouter than any of the other legs: in the male they are nearly as long as the carapace, and have the carpus and palms much inflated, and the fingers in contact only at their tips: in the female they are only about two-thirds the length of the carapace, and have the joints slender, and the fingers closely apposable throughout.

The other legs, which are subchelate, are not disproportionately short compared with the chelipeds: the last pair is sub-dorsal in position.

In the Museum collection are specimens from Karáchi.

Acanthonyx consobrinus, A. Milne-Edwards.

Acanthonyx consobrinus, A. Milne-Edwards, in Maillard's *P'île de la Réunion*, Annexe F. p. 7, pl. xvii. figs. 3, 3b.

Acanthonyx consobrinus, Heller, 'Novara' Crustacea, p. 5.

"Carapace broadened, and a little swollen, surface non-granular. Gastric region with three ill-defined tubercles. Cardiac region either smooth or with sometimes a trace of a rudimentary tubercle. Latero-

anterior border cut into four or five teeth, of which the first, or external orbital angle, is small and pointed, the second larger *et à extrémité mousse*, and the others successively smaller. The rostrum consists of two short stout spines, and the supra-ocular border forms a spine. Chelipeds short: fingers evenly toothed. Ambulatory legs ending in a recurved claw. The abdomen of the male consists of 5 segments, the 2nd, 3rd and 4th being fused together.

There are no specimens of this species in the Museum Collection, which is included in this Fauna on the authority of Dr. Heller who mentions it in the 'Novara' Collection, from Madras.

The genus or sub-genus *Scyramathia* has, I think, very close affinities with the genus *Pugettia*, and is certainly, I think, a close link between this sub-family and the following.

Sub-family iii. PISINÆ.

Eyes with commencing orbits, of which one of the most characteristic parts is a large, blunt, usually isolated and cupped post-ocular tooth or lobe, into which the eye is retractile, but never to such an extent as to completely conceal the cornea from dorsal view: there is also almost always a prominent supra-ocular eave, the anterior angle of which is sometimes produced forwards as a spine. Eye-stalks short. Basal antennal joint broad, at any rate at the base; its anterior angle generally produced to form a tooth or spine. Merus of the external maxillipeds, owing to the expansion of its antero-external angle, broader than the ischium, and carrying the palp at its antero-internal angle. Rostrum two-spined (in *Doclea* obscurely so). Legs often very long.

Key to the Indian Genera.

Alliance 1. PISOIDA. Supra-ocular eave not in close contact with the post-ocular spine or process, and generally produced, but not very conspicuously, at the antero-external angle in the plane of the rostrum.

- | | | |
|--|--|---|
| I. Spines of the rostrum separate from the base, usually long and divergent. | 1. Post-ocular tooth either not cupped, or if cupped then the carapace is armed with long acute spines of uniformly large size and regular arrangement | SCYRAMATHIA. 201 |
| | 2. Post-ocular tooth deeply cupped; spines of the carapace, if present, never of uniform size and arrangement. | i. Spines of the rostrum bearing a secondary spinule, either at tip or somewhere in their distal half NAXIA. 101, 102
ii. Spines of the rostrum without a secondary spinule HYASTENUS. |

- | | | | | | | |
|---|---|---------|----|---|---------------|---|
| II. Spines of the rostrum coalescent in their basal half. | 1. Carapace sub-circular or globular: rostrum emarginate: ambulatory legs of moderate length, stout: the entire body, and the appendages in great part, densely tomentose | DOCLEA. | 17 | | | |
| | | | | i. Post-ocular lobe completely isolated both from the supra-ocular cave and from the basal antennal joint: 2nd pair of trunk-legs never approaching six times the length of the carapace... | CHORILIBINIA. | |
| | | | | 2. Carapace broadly triangular: tip of the rostrum deeply cleft: ambulatory legs extremely long and slender. | | ii. Space between the post-ocular lobe and the supra-ocular cave, as well as that between the post-ocular lobe and the basal antennal joint occupied by a spine: 2nd pair of trunk-legs six or more times the length of the carapace..... |
| | | | | | | |

Alliance 2. LISSOIDA. Supra-ocular cave in the closest contact with the post-ocular process, and with its antero-external angle almost always (always in Indian genera) very strongly produced forwards in the plane of the rostrum.

- | | |
|---|---------------|
| i. Surface of carapace tubercular: chelipeds of the male stouter than those of the female: abdomen of the female seven-jointed..... | TYLOCARCINUS. |
| ii. Surface of carapace spiny: chelipeds of the male not stouter than those of the female: abdomen of the female five-jointed..... | |
- HOPLOPHRYS.

Alliance I. PISOIDA.

SCYRAMATHIA, A. Milne-Edwards.

Scyramathia, A. Milne-Edwards, Compt. Rend. XCI. 1881, p. 356.

Scyramathia, Sars, Norwegian North-Atlantic Expedn., Crustacea I^a. p. 5.

Scyramathia, S. I. Smith, 'Albatross' Crustacea (1884), 1886, p. 21.

Anamathia (part) Miers, 'Challenger' Brachyura, p. 25.

Carapace pyriform or elongate-triangular, armed either with tubercles, or with long spines much like those of *Anamathia* in their uniform size and definite arrangement: the hepatic and lateral epi-

branchial spines are always prominent and very conspicuous. The rostrum consists of two spines, which are usually long and slender. The eyes are small, and are retractile against a sharp post-ocular process which commonly is but little cupped: there is also a supra-ocular eave which terminates either in a forwardly directed tooth or in an upturned spine. Basal antennal joint not very broad, sharply truncated: the mobile portion of the antennæ freely exposed on either side of the rostrum.

Merus of the external maxillipeds as broad as the ischium, slightly expanded at the antero-external angle, and bearing the palp at the antero-internal angle.

Chelipeds in the adult male (but not in the female and young male) enlarged, with the palms broadened and compressed.

First pair of ambulatory legs markedly the longest.

The abdomen in both sexes consists of seven distinct segments.

There is certainly a close superficial resemblance between this genus and *Anamathia*; but I quite agree with Prof. Sars that the two forms are not very closely united. Prof. Sars thinks that *Scyramathia* is nearest to *Hystenus*, an opinion with which I concur, although I also think that there are quite as close relations to *Pugettia*.

Scyramathia pulchra, (Miers).

Anamathia pulchra, Miers, 'Challenger' Brachyura, p. 26, pl. iv. fig. 1 (adult male).

Anamathia livermorii, Wood-Mason, Ann. Mag. Nat. Hist. March 1891, p. 260 (young male and adult female).

Body and limbs everywhere closely covered with short hairs, which on the carapace are peg-shaped; and with numerous long scattered setæ. The carapace, which is subpyriform, is armed with twenty long sharp spines disposed in five longitudinal series. Of these spines five are on the gastric region, one is on the cardiac, and one on the intestinal region, one stands above either eye, one on each hepatic, and four on each branchial region: in addition there is a distinctly cupped post-ocular lobe.

The rostrum consists of two slender divergent spines, the length of which is more than half that of the carapace.

The eyes are small, and the cornea, though retractile against the post-ocular lobe, can never be concealed.

The basal antennal joint is broad, and has its antero-external angle somewhat produced: the mobile portion of the antenna is completely exposed to dorsal view.

The external maxillipeds have the ischium and merus somewhat concave.

The chelipeds vary according to sex. In the adult male they are longer than the carapace and rostrum, and are far stouter than any of the other legs: the carpus is enlarged and sculptured, the palm is broadened, as well as somewhat carinate along both edges and strongly produced at the postero-inferior angle, and the fingers are opposable in their distal half only: in the female and young male they are shorter than the carapace with the rostrum, and are hardly stouter than the other legs; all the joints are subcylindrical, and the fingers are appposable in the greater part of their extent.

In both sexes, the merus of all the legs, including the chelipeds, has a spine or tooth at the far end of its upper margin. The 2nd pair of trunk-legs, which are the longest, are, in the male, nearly twice the length of the carapace and rostrum, but in the female are considerably shorter.

Loc. Andaman Sea, 130 to 561 fathoms.

Scyramathia rivers-andersoni, n. sp.

Carapace closely covered with peg-shaped hairs with long setae interspersed: legs with few setae. The carapace, which is pyriform and somewhat inflated, has, besides a supra-ocular tooth and a sharp post-ocular process, and besides a salient hepatic spine, and a still more salient lateral epibranchial spine (about two-fifths the greatest breadth of the carapace in length) six sharply conical tubercles evenly and equidistantly arranged in a circle round a central cardiac tubercle: of these the most posterior overhangs the middle of the posterior border, while the most anterior, which is situated far back on the gastric region, is flanked on either side by a very faint eminence.

The rostrum consists of two slender divergent horns, the length of which in the male is about three-quarters, in the female about two-thirds, that of the rest of the carapace.

The eyes are small, and though freely movable forwards are not retractile backwards further than to impinge against the summit of the post-ocular process of the carapace. The basal antennal joint, which is of no great width, is sharply truncated: the mobile portion of the antenna is freely exposed on either side of the rostrum.

The chelipeds in the fully adult male (but not in the young male) are much stouter than the other legs, and are as long as the carapace and rostrum; their merus is prismatic with knife-like edges, the upper edge ending in a spine; their carpus is bicarinate, the outer carina being very prominent; the hands, which form nearly half their total

length, have the palm carinate along the upper edge, and the fingers slightly separated when closed.

In the female the chelipeds are not stouter than the other legs, are not much longer than the carapace proper, and have the fingers closely appposable throughout.

Of the ambulatory legs the first are much the longest, being nearly half again as long as the carapace and rostrum; while the last two pairs are very short and have their dactyli reduced in length, increased in strength, and strongly recurved.

	Male.	Female.
Length of carapace and rostrum...	21 millim.	16·5 millim.
„ rostrum ...	9 „	7 „
„ chelipeds ...	21 „	11 „
„ 2nd pair of trunk-legs...	31 „	20 „
„ 5th ...	15 „	11 „

Loc. Off Malabar coast, 406 fms.

Scyramathia beauchampi (Alcock and Anderson).

Anamathia beauchampi, Alcock and Anderson, J. A. S. B., 1894, Pt. ii. p. 185.

Body and legs downy, and with numerous large coarse curly clavate hairs, which are very regularly arranged on the legs, where also they are coarsest and closest. Carapace sub-triangular, with the following armature :—

On either hepatic region a great up-curved earlike spine (without any bullous base). On either branchial region, posteriorly, a strong up-turned spine; and anteriorly, near the middle line, a smaller coarse tooth. On the gastric region four sharpish tubercles. On the narrow sunken cardiac region a coarse sharp tooth. On the posterior border, in the middle line, a coarse granule.

The rostrum consists of two more (♀) or less (♂) divergent spines, the length of which is about one-third that of the rest of the carapace.

The eyes are small, and are almost devoid of pigment: they are to some extent hidden beneath a pre-ocular tooth of moderate dimensions, and are retractile against a larger laterally-compressed post-ocular plate.

The antennæ are completely exposed, from the base of the second joint of the peduncle.

The chelipeds in the male are massive, and in length are more than half again as long as the carapace and rostrum: all their joints, from

the ischium to the propodite, have one or more of their edges conspicuously and sharply cristiform, this being specially well marked in the case of the long trigonal meropodite, which has all its edges sharply phalanged, and in the case of the equally long slightly inflated palm, which has razor-like edges. The fingers, which are not nearly half the length of the palm, are acute, and have their cutting edges entire.

The 2nd-5th pairs of legs are slender, with cylindrical joints, the 2nd are nearly or quite equal in length to the chelipeds, the 3rd-5th decrease gradually in size.

In an adult female, equal in size to the male above described, the chelipeds are shorter than the 2nd pair of legs, and are similar in general proportions to the other legs.

Colours in life: "Earth-colour with the chelipeds pink."

	Male.		Female (adult.)
Length of carapace (including rostrum)...	18 millim. ...		15.5 millim.
Greatest breadth of carapace	... 12.5	,, ...	11.5 ,,
Length of cheliped	... 29	,, ...	14 ,,
Greatest breadth of palm	... 4.5	,, ...	1 ,,

Loc. Bay of Bengal, 193 and 210 fathoms.

The ova are large (diam. 1 millim.) and rather few in number.

In young males the chelipeds are of proportions intermediate between those of the adult male and female.

Scyramathia globulifera, Wood-Mason.

Pugettia globulifera, Wood-Mason, Ann. Mag. Nat. Hist. March, 1891, p. 260.

Distinguished by the vertically erect ear-like hepatic spine, the base of which forms a great polished bulla on either side of the buccal frame, giving the animal, when viewed front end on, a bat-like appearance.

The body and legs are downy, the legs being fringed with short broad curly hairs.

The carapace, in which the cardiac region is broad and prominent and not, as in *S. beauchampi*, narrow and sunken, has, besides the hepatic spine already mentioned, the following marks:—

On the branchial regions, below and anteriorly, a sharp sinuous human-ear-shaped crest; above and posteriorly a spine; and near the middle line anteriorly an acumination. On the gastric region four faint

elevations. On the cardiac region, and also on the intestinal region, in the middle line, an acuminate eminence.

The rostrum consists of two divergent spines, about one-third the length of the rest of the carapace.

The eyes stand well out from beneath the pre-ocular spine, and are retractile against a small post-ocular tooth.

The other appendages closely resemble those of the preceding species; but the chelipeds, in the adult male, are shorter, being only equal in length to the carapace and rostrum, and the fingers have their cutting edges crenulate instead of smooth.

In females and in young males the chelipeds have the same relative proportions as in *Scyramathia beauchampi*.

	Male.	Female (adult).
Length of carapace (including rostrum)...	17 millim....	13 millim.
Greatest breadth of carapace...	... 10 „ ...	7·5 „
Length of cheliped ...	... 18 „ ...	9·5 „
Greatest breadth of palm ...	... 4 „ ...	1·2 „

Loc. Andaman Sea, 130-240 fathoms.

Miers *Pugettia velutina* ('Challenger' Brachyura, p. 41, pl. vi. figs. 2, 2a, 2b) should, I think, be placed in this sub-genus—*Scyramathia*.

HYASTENUS, White.

Hyastenus, White, P. Z. S., 1847, p. 56.

Hyastenus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 658 (*et synon.*); and 'Challenger' Brachyura, p. 55.

Chorilia and *Lahainia*, Dana, U. S. Expl. Exp. Crust. I. pp. 91 and 92.

Carapace subpyriform, convex, either smooth or tuberculate, sometimes spiny. Supra-ocular eave very prominent, usually somewhat acuminate produced anteriorly: post-ocular spine, or lobe, large and excavated. The rostrum consists of two usually long slender divergent spines. Eye-stalks short, retractile against the post-ocular lobe, but never to the complete concealment of the cornea.

Basal antennal joint broad, its antero-external angle sometimes produced: the mobile portion of the antenna usually exposed to dorsal view.

Merus of the external maxillipeds as broad as, or broader than, the ischium, expanded at the antero-external angle, and bearing the palp at the antero-internal angle.

Chelipeds in the adult male enlarged: the second pair of trunk-legs usually very much longer than the 3rd 4th and 5th pairs.

The abdomen in both sexes consists of seven distinct segments.

Key to the Indian species of *Hyastenus*.

- | | | | | |
|---|--|--|---|------------------------|
| I. Denuded carapace with numerous tubercles, or spines, and erosions. | 1. Rostral spines at least as long as the carapace proper. | i. Rostral spines as long as the carapace, and nearly parallel in their proximal half: carapace indistinctly tuberculated | <i>[H. sebæ.]</i> | |
| | | ii. Rostral spines about twice as long as the carapace, and widely divergent from their origin: carapace with numerous tubercles, and with large cardiac, branchial and intestinal spines: a long terminal spine on the merus of the second pair of trunk-legs | <i>H. tenuicornis.</i> | |
| | 2. Rostral spines not much more than half the length of the carapace proper. | i. Legs coarse, the meropodites of all (including the chelipeds) nodular. | a. Numerous tubercles forming a cross on the gastric region: a median transverse tubercle in the groove between the gastric and cardiac regions | <i>H. pleione.</i> |
| | | | b. Gastric region almost smooth: no tubercle between the gastric and cardiac regions | <i>H. hilgendorfi.</i> |
| | ii. Legsslender, the meropodites smooth. | a. Carapace elongate closely covered with granules and tubercles, without spines | <i>H. oryz.</i> | |
| | | b. Conspicuously large spines on the cardiac and branchial regions | <i>H. gracilirostris.</i> | |

II. Denuded carapace smooth and polished, with a few large spines.	1. Carapace triangular, with a large epi branchial spine and at least one large sub-hepatic tubercle on either side.	i. A large intestinal and two large gastric spines in the middle line.....	<i>H. spinosus.</i>	
		ii. No large intestinal spine: a single gastric tubercle in the middle line.....	<i>H. diacanthus.</i>	
	2. Carapace elongate, with a small epi branchial tubercle, and with none of the sub-hepatic tubercles enlarged.	i. A pair of gastric tubercles in the middle line.....	<i>H. aries.</i>	
		ii. Gastric region without tubercles.	a. An erect claw-like intestinal spine.....	<i>H. calvarius.</i>
			b. No intestinal spine.....	<i>H. planasius.</i>

Hyastenus pleione (Herbst).

Cancer pleione, Herbst, Krabben, III. iii. 52, taf. lviii. fig. 5.

Naxia pleione, Gerstaecker. Archiv. fur Naturgesch. XXII. 1856, p. 114, taf. v. figs. 1-2.

Hyastenus pleione, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 250.

Hyastenus pleione, de Man, Archiv. fur Naturgesch. LIII. 1887, p. 225, taf. vii. fig. 3; and Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 18.

Hyastenus pleione, Miers, 'Challenger' Brachyura, p. 56.

Hyastenus pleione, J. R. Henderson, Trans. Linn. Soc. (2) V. 1893, p. 343.

Carapace triangular, elegantly rounded behind, pubescent like the legs and rostrum, the regions well-defined, tuberculated as follows:—six tubercles disposed in a Y or cross on the gastric region, one in the groove between the gastric and the extremely prominent cardiac region, one in the middle of the intestinal region, and three in a line on the boundary of the hepatic and pterygostomial regions; on either branchial region are two longitudinal rows of tubercles, the upper row being the more distinct, but the last tubercle in the lower row being the largest, and forming a rather prominent epi branchial spine; finally on either side of the groove separating the cardiac and intestinal regions is a prominent tooth.

The rostrum consists of two slender divergent spines, which in the male are half the length of the carapace proper, but in the female are considerably less.

The basal antennal joint has its outer margin, anteriorly, bilobed.

The hairy trunk-legs have the upper surface somewhat uneven or actually nodular.

The chelipeds in the male are stouter than the other legs, and are as

long as the carapace *plus* half the rostrum; the fingers, which are hardly one half shorter than the short palm, are arched and meet only near their tips: in the female the chelipeds are rather more slender than the other legs, are only as long as the post-ocular portion of the carapace, and have nearly straight fingers that meet in the greater part of their extent.

The second pair of legs, in both sexes, are considerably longer than the chelipeds and than any of the three last pairs: the dactyli of all the ambulatory legs are stout, recurved, and serrated along the posterior margin.

In the Museum collection are numerous specimens of both sexes, from Ceylon and Mergui.

Hyastenus hilgendorfi, de Man.

Hyastenus hilgendorfi, de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1886, p. 14, pl. i. figs. 3 and 4.

This species much resembles *H. pleione*, but is distinguished by the following constant characters:—the carapace is but faintly tuberculated, and, in particular, there is no tubercle between the gastric and cardiac regions: the dactyli of the ambulatory legs are very strongly toothed, instead of merely serrated, along the posterior margin: in the male the rostrum is nearly two-thirds the length of the carapace, and the chelipeds are as long as the carapace and rostrum combined, and nearly as long as the second pair of trunk-legs,—this being largely due to the increased length of the palm.

Carapace subpyriform, and, like the rostrum and legs, pubescent; the regions moderately well-defined.

The gastric region is either quite smooth, or presents three faint elevations disposed in a triangle base forwards. There is a small tubercle near the middle of the intestinal region; and a line of granulations along the boundary between the hepatic and pterygostomian regions, which line is continued backwards, along the side of the branchial region, to end at a distinct lateral epibranchial spine: there is also a more or less distinct line of granules on the dorsal aspect of the epibranchial region.

The rostrum consists of two divergent spines, the length of which in the male is nearly two-thirds that of the carapace proper, but is considerably less in the female. Basal antennal joint with the outer margin sinuously curved.

The trunk-legs have the surface somewhat uneven: the chelipeds in the male are much stouter than the other legs, and are as long as the

carapace and rostrum, the palm being nearly twice the length of the fingers, which are not much arched and meet in their distal half: in the female the chelipeds are rather slenderer than the other legs, and are equal to the postrostral portion of the carapace in length. The 2nd pair of legs are hardly longer than the (male) chelipeds, but are very much longer than the last three pairs: the dactyli in all are stout, recurved, and strongly toothed along the posterior margin.

Specimens are in the Museum collection from Ceylon, Ganjam, Mergui, the Nicobars, and the Straits of Malacca.

Hyastenus diacanthus (de Haan).

Pisa (*Naxia*) *diacantha*, de Haan, Faun. Japon. Crust., p. 96, pl. xxiv. fig. 1.

Naxia diacantha, Adams and White, 'Samarang' Crust., p. 10.

Naxia diacantha, Stimpson, Proc. Acad. Nat. Sci. Philad. 1857, p. 218.

Naxia diacantha, Heller, 'Novara' Crust., p. 3.

Hyastenus diacanthus, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 250.

Naxia diacantha, Brocchi, Ann. Sci. Nat. (6) II. 1875, Art. 2, p. 94, pl. xix. figs. 172, 173 (male appendages).

Hyastenus diacanthus, Miers, Cat. Crust. New Zealand, p. 9; and P. Z. S., 1879, pp. 19 and 26; and Zoology H. M. S. 'Alert,' pp. 182 and 194; and 'Challenger' Brachyura, p. 57.

Hyastenus diacanthus, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 442; and Cat. Austral. Crust., p. 20.

Hyastenus diacanthus, de Man, Archiv. fur Naturgesch., LIII. 1887, p. 220.

Naxia diacantha, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl. XXIII. 1888-89, No. 4, p. 51, pl. ii. fig. 5.

[*Hyastenus diacanthus*, Cano, Boll. Soc. Nat. Napol. III. 1889, p. 178.]

Hyastenus diacanthus, A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109.

Hyastenus diacanthus, Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 55; and Zool. Forsch. Austral. Malay. Archip., Jena., 1894, p. 42.

Hyastenus diacanthus, Mary Rathbun, Proc. U. S. Nat. Mus. Vol. XVI. 1893, p. 85.

Body and legs densely tomentose, often much encrusted with sponges, etc. Carapace pyriform, with the regions strongly convex, well-defined, and when denuded, smooth and polished: on the gastric region, in the middle line, there is an acuminate tubercle, on either pterygostomial region at least one large tooth, and near the hinder limit of either branchial region a horizontally projecting lateral epibranchial spine.

The rostrum consists of two more or less divergent horns, the length of which in the adult male is from half to nearly two-thirds that of the carapace proper, but in the female is less. The basal antennal joint is much inflated behind and constricted in front.

The chelipeds in the male are stouter than any of the other legs, and are equal in length to the carapace *plus* half the rostrum; the fingers, which are arched and meet in rather less than their distal half, are nearly as long as the short inflated palm. In the female and young male the chelipeds are rather more slender than any of the other legs, and in length are equal to the post-ocular portion of the carapace; and the fingers, which are almost straight, meet in the greater part of their extent. The second pair of trunk-legs are nearly twice the length of the (male) chelipeds, and are far longer than any of the last three pairs: the recurved and densely tomentose dactyli have the posterior margin almost smooth.

Besides specimens from the Australian and Chinese Seas, the Museum possesses specimens from Ceylon, Orissa, Tavoy, and the Andamans.

Hyastenus spinosus, A. Milne-Edwards.

Hyastenus spinosus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 250.

Hyastenus spinosus, Miers, 'Challenger' Brachyura, p. 56.

This species differs from *H. diacanthus* only in the following particulars:—the body and limbs are less densely tomentose; the gastric region, instead of a single acuminate tubercle, has two strong spines in the middle line; there is a stout spine, in the middle line, close to the posterior border of the carapace; the lateral epibranchial spines are larger.

These differences are constant in a large series of specimens from different parts of the sea-coast of India: but in two specimens which seem referable to this species the gastric region is quite smooth, though abnormally convex.

Hyastenus aries (Latr.)

[*Pisa aries*, Latr. Encyc. X. p. 140].

Chorinus aries, Milne-Edwards, Hist. Nat. Crust. I. 315.

Hyastenus aries, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 250.

Chorinus aries, Hilgendorf, MB. Ak. Wiss. Berl. 1878, p. 786.

Chorinus aries, E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 41 (gastric teeth).

Hyastenus aries, Miers, 'Challenger' Brachyura, p. 56.

Very closely resembling *H. spinosus*, from which it differs only in the following particulars—adult males of nearly equal size being compared:—(1) the rostral horns, instead of being long cylindrical divergent and down-curved only at tip, are short (being only one-third the length of the carapace proper in the male, and only about one-fourth

in the female), somewhat compressed horizontally, almost parallel or even a little incurved, and perceptibly though very slightly deflexed from the base; (2) the carapace is much more convex and swollen, with the lateral epibranchial and the median posterior spines much smaller; (3) the chelipeds have the palm less enlarged, and the fingers nearly straight, instead of arched; (4) the anterior angle of the supra-orbital eave, instead of being sharply produced, is obtuse.

The Museum possesses specimens from the Orissa Coast and Gulf of Martaban, and also from the Straits of Malacca.

Hyastenus planasius, Ad. & White.

Pisa planasia, Adams and White, 'Samarang' Crust., p. 9, pl. ii. figs. 4 and 5.

Hyastenus planasius, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 250.

Hyastenus (Chorilia) pianasius, Miers, Zoology H. M. S. 'Alert,' pp. 182 and 196; and 'Challenger' Brachyura, p. 57.

Hyastenus planasius, Walker, Journ. Linn. Soc. Zool. Vol. XX. p. 109.

Carapace elongate-ovate, its surface smooth and polished anteriorly, finely granulose posteriorly, and with scattered tufts of hairs: a small eminence in the middle of the gastric region, and a small lateral epibranchial spinule, in front of which latter there may be a line of granules: lateral margin with three spinules anteriorly, two of which are on the pterygostomian region.

The rostrum is formed by two parallel spines, the tips of which are somewhat incurved, and the length of which is about one-sixth that of the carapace proper. The supra-ocular margin is, as usual, very prominent, and has its anterior angle somewhat produced. The antero-external angle of the basal antennal joint forms a distinct tooth visible from above. The legs are tomentose with additional long scattered setæ: the second pair (1st ambulatory legs) are, as usual, markedly the longest, being half again as long as the carapace and rostrum: the dactyli are short, stout, recurved, and serrated posteriorly. The chelipeds are described by Adams and White as follows:—"small, slender, equal in size, covered with scattered long stout hairs; the third joint sub-cylindrical, curved inwards and enlarged anteriorly; fourth joint short, rounded, and curved, with two small tubercles on the outer and upper surface; fifth joint rather slender, sub-cylindrical, laterally compressed; claws slightly gaping in the middle, curved inwards, and finely denticulated." As, however, the male specimen figured does not seem to be adult, these characters are perhaps changeable with age.

In the Museum collection are a young male and female from Ganjam and Arrakan.

Hyastenus calvarius, n. sp.

This species—females alone being available for comparison—differs from *H. planasius* chiefly in the following characters:—(1) there is an erect claw-like spine on the posterior border of the carapace in the middle line; (2) the spines of the rostrum are straight, divergent, and about half the length of the carapace; (3) the dactyli are longer and slenderer.

Three females—two of which are laden with eggs—from the Andamans. The larger egg-laden female measures 14 millim. from the tip of the rostrum to the posterior border of the carapace.

Description of the female.

Carapace elongate-ovate, with the surface, when denuded of scattered setæ, smooth and polished: the gastric region is very convex: the only armature of the carapace is (1) a large erect claw-like spine near the posterior border in the middle line, (2) a small lateral epibranchial spinule on either side, and (3) two or three granules along the antero-lateral border in the pterygostomian region. The rostrum is formed of two straight divergent spines, the length of which is about half that of the carapace proper. The antero-lateral angle of the prominent supra-ocular eave is sharp; and that of the basal antennal joint is produced to form a spine which is plainly visible from above.

The legs are more or less fringed with stout club-shaped hairs: the second pair are, as usual, the longest: the dactyli are long and slender, and are recurved, with the posterior margin serrate. The chelipeds are slender, and the fingers meet in the greater part of their extent.

Hyastenus sebæ, White.

Seba, Thesaurus, III. xviii. 12.

Hyastenus sebæ, White, P. Z. S., 1847, p. 57; and Ann. Mag. Nat. Hist., Vol. XX. 1847, p. 61; and 'Samarang' Crustacea, p. 11.

Hyastenus sebæ, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 249.

Hyastenus sebæ, de Man, Archiv. fur Naturgesch., LIII. 1887, p. 223.

Hyastenus sebæ, Miers, 'Challenger' Brachyura, p. 56.

Hyastenus sebæ, Ortmann, Zool. Forsch. Austral. Malay. Archip. Jena, 1894, p. 42.

Carapace very elongate-triangular, its surface eroded and sculptured, but without distinct tubercles or spines. The rostral spines, which are equal in length to the carapace, are parallel in their proximal half. The chelipeds in the male are equal in length to the carapace plus one-third of the rostrum: their merus is not much stouter than that of the next pair of legs, but the palm is broadened and somewhat inflated: the fingers, which are hardly more than half the length of

the palm, are arched, and meet only at the tip. The other legs are slender, the second pair being much longer than the last three pairs and longer than the chelipeds.

The Museum possesses a specimen from Mauritius, which I have included here for the sake of comparison.

Hyastenus oryx, A. Milne-Edwards.

Hyastenus oryx, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 250, pl. xiv. fig. 1.

Hyastenus oryx, Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 442; and Cat. Austral. Crust., p. 20.

Hyastenus (Chorilia) oryx, Miers, Zool. H. M. S. 'Alert,' pp. 182 and 195, 517 and 522; and 'Challenger' Brachyura, p. 58.

Hyastenus oryx, de Man, Archiv. fur Naturgesch., LIII. 1887, p. 224, taf. vii. fig. 2.

Hyastenus oryx, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl. XXIII. 1888-89, No. 4, p. 50, pl. iv. fig. 4.

Hyastenus oryx, A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109.

Carapace pyriform, little setose, crisply and rather closely tuberculated, but without any spines, the tubercles on the gastric region being disposed in the form of a cross or anchor. The rostrum consists of two slender horns, which in the male are about half the length of the carapace proper, and strongly resemble the horns of an *Oryx* in miniature: in the female they are not one-third the length of the carapace, and are nearly parallel.

The supra-ocular cave is sharply angled, but not produced, anteriorly. The basal antennal joint is sharply toothed at the antero-external angle.

The chelipeds in the male are as long as the carapace *plus* two-thirds of the rostrum: their merus is slender, but the palms are broadened and inflated; and the fingers, which are from half to two-thirds the length of the palm, are arched, and meet only at the tip. In the female the chelipeds are considerably shorter than the post-ocular portion of the carapace, and are rather more slender than the ambulatory legs, the fingers being but little arched, and little separated when clenched.

The ambulatory legs are slender, with slender almost smooth actyli: the first pair, which are considerably the longest, are about one-fourth longer than the carapace and rostrum.

This, like *Hyastenus calvarius*, is a small species, an egg-laden female of average size measuring only 14 millim. from the tip of the trum to the posterior border of the carapace. It is a common species at the Andamans, and has also been taken off Ceylon at 34 fathoms.

Hyastenus gracilirostris, Miers.

Hyastenus gracilirostris, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 12, pl. iv. fig. 7; and 'Challenger' Brachyura, p. 56.

Carapace subpyriform, hardly at all setose, with numerous sharp tubercles and spinules. Specially noticeable are three spinules, longitudinally arranged in the middle line, on the gastric region, a strong conical spine on the cardiac region, a sharp tubercle on the posterior margin, and two spines on each of the branchial regions, of which the larger occupies the usual position of the lateral epibranchial spine.

The rostrum, which does not vary according to sex, consists of two slender divergent spines, the length of which is about one-third that of the carapace. The post-ocular lobe projects very strongly, and the supra-ocular eave has both the anterior and the posterior angle pronounced. The basal antennal joint has a well-marked tubercle or blunt spine at its antero-external angle.

The chelipeds in the male are equal in length to the post-rostral portion of the carapace, and have a few small granules on the merus carpus and upper edge of the palm; the merus is slender, but the palm is broadened and is not much longer than the fingers, which are arched and meet only at the tip. In the female the chelipeds are rather shorter than the post-ocular portion of the carapace, are very slender, and have nearly straight fingers.

The ambulatory legs are slender, with slender smooth-edged dactyli: the first pair are, as usual, much the longest.

This also is a small species, and egg-laden female of average size being only 10 millim. in length.

In the Museum collection are specimens from the Madras coast.

Hyastenus tenuicornis, Pocock.

Hyastenus tenuicornis, Pocock, Ann. Mag. Nat. Hist., Vol. V. 1890, p. 76.

Distinguished by the enormous length of the rostral spines, and by the curious form—described below—of the supra-ocular eave and post-ocular lobe.

Carapace subpyriform, somewhat depressed, with the regions well-defined; its surface with many long scattered setæ, and with numerous granules and some large spines. Specially noticeable are five or seven granules, arranged in the form of a cross, on the gastric region; two huge acuminate tubercles, in the middle line, posteriorly; and three spines on either branchial region, the hindmost and lowermost of which is of great size.

The rostrum consists of two slender, exceedingly divergent spines,

the length of which in the male is about twice, in the female about once and a fifth, that of the carapace.

The post-ocular lobe is unique in form: it is very prominent, and has a stout pedicle and a compressed crown, the angles of which are produced. The supra-ocular eave is also unique: it also is very prominent, and has its antero-external angle produced forwards and upwards, and its postero-external angle produced backwards towards the post-ocular lobe. The basal antennal joint is deeply grooved longitudinally: its antero-external angle forms a strong spine visible from above, and its outer edge bears two distinct teeth which stretch towards the supra-ocular and post-ocular spines respectively. All the trunk-legs are very slender: the first two pairs have a strong spine on the far end of the upper border of the merus, but this in the last three pairs is represented by a small tubercle. The chelipeds, even in the male, are slender throughout, and have long slender fluted palms which are three times the length of the fingers: the latter, though denticulated throughout and but little arched, meet, in the male, only in their distal half.

The first pair of ambulatory legs are, as usual, much the longest: in all the dactyli are long and slender, but have the posterior edge sharply serrated.

This also is a small species, an egg-laden female of average size measuring only 17 millim., more than half of which is rostrum.

Off Cheduba (Arakan coast) 7 fathoms: off Ceylon 30-34 fathoms.

Dr. Henderson (Tr. Linn. Soc., Zool., 1893, p. 344) also includes in the Indian Fauna, but with some doubt, the two following species:—

1. *Hyastenus convexus*, Miers Zool., H. M. S. 'Alert,' p. 196, pl. xviii. fig. B. (*N. E. Australia; Penang.*).

2. *Hyastenus brockii*, de Man, Archiv. fur Naturgesch. LIIL., 1887, p. 221, taf. vii. fig. 1. (*Amboina*).

As Dr. Henderson seems to be not quite sure of his identification, and as we have no specimens in the Museum collection, I have not noticed these two species at length.

NAXIA, Edw., Miers.

Naxia, Milne-Edwards, Hist. Nat. Crust. I. 313.

Naxia, de Haan, Faun. Japon. Crust., p. 84.

Naxia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 658 (*et synon.* Naxioides, A. M. Edw. and Podopisa Hilgendorf); and 'Challenger' Brachyura, p. 59.

Carapace subpyriform, moderately convex, rounded behind, and armed with spines or tubercles on the dorsal surface. Spines of the

rostrum well developed, subcylindrical, parallel or divergent, and bearing on the inner margin, near to the extremity, a small accessory spine or spinule. Abdomen (in the male) distinctly seven-jointed; in the female some of the segments may be coalescent. Eyes small, supra-ocular eave very prominent, its antero-external angle sometimes produced to a spine: post-ocular lobe also very prominent, its edge unequally bi- or tri-lobed. Antennæ with the basal joint enlarged, with a spine or tubercle at the antero-lateral angle, and sometimes with another on the outer margin; the flagellum either exposed, or partially concealed in a dorsal view by the rostral spines. Merus of the external maxillipeds distally truncated, with the antero-external angle little, if at all, produced, and the antero-internal angle emarginate. Chelipeds (in the male) slender and moderately developed, palm usually somewhat elongated, fingers denticulated near the distal extremity, and having between them when closed a small hiatus at the base. Ambulatory legs slender and somewhat elongated, the first pair much the longest, with the joints subcylindrical; dactyli nearly straight.

Key to the Indian species of Naxia.

I. Armature of the carapace consisting almost entirely of large clean-cut spines *N. hystrix*.

1. Spines of the rostrum parallel to near the tip: supra-ocular spine obsolete: meropodites of the trunk-legs without a terminal spine *N. hirta*.

II. Armature of the carapace consisting chiefly of tubercles, among which there are sometimes a few coarse spines.

2. Spines of the rostrum divergent from the base: supra-ocular spine present: meropodites of some of the trunk-legs with a large terminal spine.

i. Spines of the rostrum considerably more than half the length of the carapace: supra-ocular spine very large and acute: meropodites of all the trunk-legs with a terminal spine: palms long and slender.

a. Rostral spines widely divergent: no large spines on the branchial or intestinal regions *N. taurus*.

b. Rostral spines moderately divergent: several large spines on the branchial regions and in the middle line of the carapace *N. cerastes*.

ii. Spines of the rostrum considerably less than half the length of the carapace: supra-ocular spine blunt: meropodites of the last three pairs of trunk-legs unarmed: palms short and inflated *N. investigatoris*.

Naxia investigatoris, n. sp. Pl. IV. fig. 3.

Distinguished from all other Indian species by the form of the male chelipeds, of which the palm, instead of being long and slender, is short and broadly inflated.

Carapace subpyriform, with all the regions well-defined, and the whole surface, from the base of the rostral spines, sharply tubercular.

The rostral spines in the male and sometimes in the female are hardly one-third the length of the carapace proper, and are divergent, with the accessory spine in the middle of the distal half: often, but not always, in the female they are less than one-fourth the length of the carapace, are little divergent, and bear the accessory spinule near the tip. The antero-external angle of the prominent supra-ocular eave is surmounted by a blunt spine: the basal antennal joint has a similar spine at its antero-external angle, and another near the middle of its outer border.

The chelipeds are granular, and their meropodite has a small spinule at the distal end of its upper border: in the male they are a little longer than the carapace, the palm is short—less than twice the length of the fingers—inflated, and enlarged from behind forwards, and the fingers are strongly arched and meet only at the tip: in the female they are only as long as the post-rostral portion of the carapace, are slender throughout, and have nearly straight fingers. The 2nd pair of trunk-legs (1st pair of ambulatory legs) are $2\frac{1}{2}$ times the length of the carapace, and have the meropodite armed with a strong spine at the distal end of its upper border, and the dactylus of remarkable length, nearly equal to the propodite: the other legs are much shorter, and have the spine replaced by a small tubercle, their dactylus being of ordinary length.

Colours in spirit, pale ochre.

Loc. Andamans; and off Ceylon, 34 fathoms.

	Male.	Ovigerous Female.
Length of carapace and rostrum ...	19 millim.	17 millim.
Greatest breadth of carapace ...	10.5 "	10 "
Length of chelipeds	23 "	14 "
Length of 2nd pair of legs...	41 "	36 "

Naxia hirta, A. Milne-Edwards.

Naxioides hirta, A. Milne-Edwards, Ann. Soc. Ent. Fr. (4) V. 1865, p. 143, pl. iv. fig. 1.

Podopisa petersii, Hilgendorf, MB. Ak. Berl., 1878, p. 785, taf. i. figs. 1-5.

Naxia petersii, Miers, Zoology of H. M. S. 'Alert,' p. 523.

Naxia hirta, Miers, 'Challenger' Brachyura, p. 61.

Naxia petersii, de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 19.

Naxia hirta, Pocock, Ann. Mag. Nat. Hist., Vol. V. 1890, p. 79.

Naxia hirta, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 345.

Carapace pyriform, with the regions well-defined and the surface from the base of the rostral spines unevenly granular and tubercular. From the rough surface there stand out (1) at least two good sized spines on either branchial region, (2) a sharp unciform tubercle close to the posterior border near the middle line, and (3) a stout nipple-shaped tubercle near the middle of the pterygostomian region.

The rostral spines, which in both sexes are close together and parallel in more than half their extent, are from one-third (male) to two-sevenths (female) the length of the carapace proper; from the point of origin of the accessory spines, which are situated at the end of the parallel portion, they are elegantly divergent.

The prominent supra-ocular eave has the antero-external angle slightly upturned. The basal antennal joint has a stout spine anteriorly, and a coarse tooth in the middle of its outer border.

The chelipeds are smooth, and are slender in both sexes, but most so in the female: in the male they are equal in length to the post-rostral, in the female to the post-ocular portion of the carapace: the palms are slender and sub-cylindrical, and are twice the length of the fingers, which latter are hardly arched, and are therefore but slightly separated at the base when clenched.

All the ambulatory legs are slender and smooth, and the first pair are considerably the longest, being nearly twice the length of the carapace and rostrum, the dactylus not being abnormally elongate.

The body and legs are covered with a short fine down, and the colour in spirit is usually mottled reddish and yellow.

In the Museum collection are specimens from the Andamans and from Ceylon.

Naxia taurus, Pocock.

Naxia taurus, Pocock, Ann. Mag. Nat. Hist. Vol. V. 1890, pp. 77 and 79.

Naxia taurus, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 346.

Distinguished by the very long and widely divergent rostral spines.

Carapace pyriform, with the regions well-defined, and the surface, from the base of the rostral spines, unevenly granular and tubercular beneath tufts of hair. Among the tubercles three on the gastric region in the middle line, three in a triangle on the intestinal region, and three on either branchial region attract attention.

The rostral spines, which are considerably more than half the carapace in length, are widely divergent—the distance between their tips being more than three-quarters of their length: the accessory spine is situated not far in front of the middle.

The prominent supra-ocular eave has a strong sharp spine, and there is an even stronger and sharper spine at the antero-external angle of the basal antennal joint, as well as a prominent tooth near the middle of the outer border of this joint.

The chelipeds are granular: in the male they are equal in length to the carapace *plus* four-fifths of the rostrum, and, though slender, are considerably stouter than the other legs, especially as to the palm, which is more than twice the length of the fingers—the fingers being but little curved and therefore but little separated when closed: the meropodite has a strong sharp spine at the distal end of its upper border.

The ambulatory legs are slender: the meropodites of all but the last pair are armed as to the distal end of the upper border with a spine, which is of conspicuous size in the case of the first pair. The first pair are markedly the longest, being nearly twice the length of the carapace measured with the long rostrum, and have the dactylus extremely long—nearly equal in length to the propodite.

A single male specimen occurs in the collection, having been dredged off the Andamans in 36 fathoms.

Naxia cerastes, Ortmann.

Naxia cerastes, Ortmann, in Semon, Zool. Forschungreisen Austral. und Malay. Archipel., Crust., p. 43, taf. iii. fig. 4.

This species appears to be very similar to *Naxia taurus*, with which it may, perhaps, even be identical. It differs from *Naxia taurus*, comparing specimens of the same size and sex, in the following unimportant particulars:—(1) the rostral spines are less divergent; (2) the carapace, in addition to the granules and tubercles, is armed with several large spines, of which three on either branchial region and one on the intestinal region are of conspicuous size, while several in the middle line on the gastric and cardiac regions are hardly smaller.

In the collection are a perfect male and female from the Andamans.

Naxia hystrix, Miers.

Naxia hystrix, Miers, 'Challenger' Brachyura, p. 60, pl. vi. fig. 4.

Naxia hystrix, R. I. Pocock, Ann. Mag. Nat. Hist., Vol. V. 1890, p. 79.

Naxia hystrix, Ortmann, Zool. Forsch. in Austral. und Malay. Archipel., Crust., p. 43.

Body closely beset with short knobbed hairs, among which longer setæ are interspersed.

Carapace subpyriform, armed with numerous long sharp spines as follows:—four, arranged in a triangle base forwards, on the gastric region; one on the cardiac, and one (very large) on the intestinal region; one on either hepatic region; two or three on either pterygostomian region; and, finally, on either branchial region three dorsal and three lateral: between these large spines some spinules and sharp granules are interspersed. In the male there is a pair of strong spines on the sternum between the chelipeds; and each abdominal tergum has a strong median spine: in the female five parallel rows of spines are found on the ventral surface, three of which belong to the abdominal terga, and one on either side to the sternum.

The rostral spines are short (about one-fifth the length of the carapace in the male, and rather less in the female), and divergent: the accessory spinule is found on their inner margin near the tip.

The basal antennal joint has a sharp spine at its antero-external angle, and a tooth near the middle of its outer margin. The antero-external angle of the prominent supra-ocular eave is surmounted by a sharp spine.

The chelipeds in the female and young male are rather more slender than the other legs, and are a little longer than the carapace and rostrum: the palms are slender and subcylindrical, and are nearly three times as long as the fingers, which are nearly straight and appposable throughout. The ambulatory legs are slender, and have very long slender dactyli: the first pair, which are much the longest, are nearly three times as long as the carapace and rostrum.

In the Museum collection are specimens from the Andaman Sea down to 40 fathoms.

CHORILIBINIA, Lockington, Miers.

Chorilibinia, Lockington, Proc. Ac. Nat. Sci. Calif., Vol. VII. 1876, p. 69.

Chorilibinia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 45; and 'Challenger' Brachyura, p. 45.

Chlorolibinia, Haswell, Cat. Austral. Crust., p. 17.

Carapace broadly subpyriform, spinose. Rostrum formed of two spines which are coalescent in their basal half. The commencing orbit, which does not afford much concealment to the fully retracted eye, is formed by a little-prominent supra-ocular eave, and a cupped (and isolated) post-ocular tooth. The basal antennal joint is broad, has its antero-external angle more or less produced, and has also a lobe on its

outer margin, near the base. Merus of the external maxillipeds as broad as the ischium, and with the antero-external angle produced.

Chelipeds slender; ambulatory legs very long and slender. Abdomen of the male consisting of seven distinct segments.

Chorilibinia andamanica, n. sp. Plate V. figs. 2, 2a.

Distinguished from *Chorilibinia gracilipes*, Miers (Ann. Mag. Nat. Hist. Vol. IV. 1879, p. 7, pl. iv. fig. 4), (1) by the much less divergent rostral spines; (2) by the pair of great spines—one pointing forwards, the other backwards—on the cardiac region; (3) by the much slenderer chelipeds.

Carapace broadly subpyriform, with (1) a median line of tubercles and spines increasing in size from before backwards, four of the spines—namely one on the after limit of the gastric region, two on the cardiac region, and one near the posterior border—being conspicuously large; and with (2) on either side a supra-marginal line of spines as follows—a tooth at the angle of the buccal frame, a large hepatic spine pointing downwards, and four branchial spines, the last of which directed obliquely backwards is much the largest. Besides these large spines there are numerous, symmetrically disposed, sharp granules. The rostrum, which measured from the anterior border of the orbit is about one-third the length of the carapace proper, ends in two very slightly divergent spines.

The eyes are short and thick; and the orbit is formed by a moderately prominent supra-ocular eave separated by a narrow interval from a broad isolated post-ocular pocket.

The basal antennal joint is moderately broad, and bears two teeth, one at the antero-lateral angle, the other at the base—the latter inclining towards the post-ocular pocket.

The external maxillipeds completely close the buccal frame, the merus being as broad as the ischium.

The chelipeds are not stouter than the legs, and are but little longer than the carapace (rostrum included): the next pair of legs are considerably more than three times, and the third pair are about three times, this length; while the 4th and 5th pairs are very short.

The abdominal segments from the third to the sixth inclusive, are coalescent.

The sternum between the chelipeds carries a pair of very strong sharp teeth.

Loc. Andamans.

EGERIA, Leach.

Egeria, Leach, Zool. Miscell. Vol. II. p. 39.

Egeria, Milne-Edwards, Hist. Nat. Crust. I. 290.

Egeria, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 654; and 'Challenger' Brachyura, p. 44.

Carapace subpyriform, nearly as broad as long, convex and tuberculated. The rostrum consists of two vertically compressed spines of no great length, which are fused together in half or more of their extent. The eyes are short. The commencing orbits are formed by a supra-ocular cave and a post-ocular tooth, the interval between this tooth and the supra-ocular cave above, and between it and the basal antennal joint below, being partly closed in each case by a spine. The basal antennal joint is truncate-triangular; its antero-external angle is produced, and there is a second spine behind the middle of the outer border: the mobile portion of the antenna is visible from above on either side of the rostrum. The merus of the external maxillipeds is as broad as the ischium. Chelipeds in the adult male considerably longer than the carapace and rostrum, and having the palms inflated. Chelipeds in the female very slender throughout, and a little longer than the carapace and rostrum. Ambulatory legs extremely long and slender, the first pair being about six times the length of the carapace and rostrum: the dactylus in all is remarkably long. Abdomen of male seven-jointed: of female five-jointed.

Egeria arachnoides (Rumph.), Edw.

Egeria arachnoides, Rumph, pl. viii. fig. 4; [and Latreille, Encyc. Pl. 281, fig. 1;] and Milne-Edwards, Hist. Nat. Crust., I. 291; and Neumann, Syst. Uebers., 1878, p. 19; and Haswell, P. L. S., N. S. Wales, IV. 1879, p. 439, and Cat. Austr. Crust., p. 11; and Miers Zool. Alert, pp. 182 and 191, and 'Challenger' Brachyura, p. 44; and C. W. S. Aurivillius, Kongl. Sv. Vet. Ak. Handl., XXIII. 1888-89, No. 4, p. 44; and Ortmann, Zool. Jahrb. Syst. etc., VII. 1893, p. 48; and J. R. Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 343.

Cancer longipes, Herbst, Krabben, I. ii. 231, pl. xvi. fig. 93; and Fabricius Syst. Ent. ii. 466.

Inachus longipes, Fabr. Suppl., p. 358.

Macropus longipes, Latr. Hist. Nat. Crust. VI. 111.

Leptopus longipes, Lamk. Hist. An. Sansvert. V. 235; and Desmarest Consid. Crust. p. 159; [and Guérin, Icon. Reg. An. Crust., pl. x. fig. 3]; and Cuvier, Regne An. Crust., pl. xxiv. fig. 1; and Adams and White, 'Samarang' Crust., p. 7; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 216; and A. O. Walker, Journ. Linn. Soc. Zool., XX. p. 109; and M. J. Rathbun, P. U. S. N. M., XVI. 1893, p. 95.

Egeria indica, Leach, Zool. Miscel. II. pl. lxxiii; and Desmarest, Consid. Crust., p. 157, pl. xxvi. fig. 2; and Milne-Edwards, Hist. Nat. Crust. I. 292; and Adams and White, 'Samarang' Crust., p. 6; and E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 41 (gastric teeth).

Egeria herbstii, Milne-Edwards, Hist Nat. Crust. I. 292; and Heller, 'Novara' Crust., p. 4; and Haswell, P. L. S., N. S. Wales, IV. 1879, p. 439, and Cat. Austr. Crust., p. 12.

Our large series of perfect specimens fully supports Mr. Miers' conclusion that all the hitherto described species of *Egeria* may be regarded as identical with the species rather poorly figured in Rumph's *Amboinische Rariteitkamer*.

Carapace subpyriform, or, rostrum excluded, subcircular, its breadth being equal to its length behind the base of the eye-stalks: the regions are distinctly delimited, and the surface is uneven and armed with some symmetrically disposed spines and spinules of which the six following are very conspicuously large, namely:—in the middle line, one on the cardiac and one on the intestinal region, and, on either side, a sub-hepatic and a lateral epibranchial: besides these there is (1) a conspicuous set of spinules arranged in the form of a T on the gastric region—the last in the vertical limb of the T being a distinct spine; and (2) two series of distant spinules on either branchial region.

The rostrum varies somewhat: it is always short, and typically, consists of two vertically compressed spines which are fused in rather more than half their extent and have the tips slightly divergent: but sometimes the fusion is more extensive, or the tips are broken, and the rostrum then has the form of an emarginate stump. The supra-ocular cave is surmounted by a small sharp tooth anteriorly.

The chelipeds in the adult male are more than half again as long as the carapace and rostrum: the merus is a little enlarged distally, and the palm is inflated and distally enlarged: the fingers, which are half the length of the palm, are slightly separated at the base when clenched.

The chelipeds in the female are only one-fourth longer than the carapace and rostrum, and are the slenderest of all the trunk-legs.

The first pair of ambulatory legs are at least six times the length of the carapace and rostrum, rather more than a third of their extent being formed by the dactylus: the other legs gradually decrease in length to the fourth and last, which are about $2\frac{1}{3}$ times the length of the carapace and rostrum. The joints in all are very slender, cylindrical, and except for a spine at the distal end of the upper border of the merus, quite smooth.

Conspicuous on the sternum of the male is a pair of large teeth, placed between the front legs.

The body and legs are usually covered with an excessively short fine down: the legs are often banded, sometimes very distinctly, with dull red.

Egeria investigatoris, n. sp.

This species closely resembles *Egeria arachnoides*, adult males being compared, but differs in the following particulars:—(1) the carapace is more nearly circular, owing to the greater convexity of the hepatic and pterygostomian regions; (2) the spines on the carapace, although almost the same in arrangement, are markedly larger; (3) the sternum has a transverse group of spines on every segment; (4) every abdominal tergum except the last has a large median spine; (5) the hiatus between the post-ocular tooth and the basal antennal joint is scarcely affected by a small denticle; (6) the chelipeds in the adult male are $2\frac{1}{3}$ times the length of the carapace, and have the palm long, very slender, and cylindrical, and the fingers sharply and evenly denticulated all along their appposable edge.

The legs are in fragments, but the joints that remain are extremely long and slender.

Length of carapace and rostrum	...	24 + 5 = 29	millim.
Breadth of carapace	...	24	„
Length of male chelipeds	...	65.5	„

Loc. Off Ceylon, 32 fathoms.

DOCLEA, Leach.

Doclea, Leach, Zool. Miscell., Vol. II. p. 41.

Doclea, Milne-Edwards, Hist. Nat. Crust. I. 292.

Doclea, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 652.

Body and appendages tomentose, usually very densely so.

Carapace circular, armed at the sides, and often on the dorsal surface also, with a few spines.

The rostrum consists of two vertically compressed spines which are fused together in almost the whole of their extent and are usually short: it has hence, usually, the appearance of a short flat emarginate beak, hardly breaking the general outline of the carapace. (In one species—*Doclea tetraptera*—the rostrum is rather long).

The eyes are very small, and the commencing orbits are formed by an acute post-ocular tooth and a little-prominent supra-ocular eave. The antennæ are very short and inconspicuous—not reaching to the end of the short rostrum: the basal joint is short, broadly triangular, the apex forming a sharp tooth: the flagella are almost rudimentary.

The buccal frame is somewhat arched in front. The external maxillipeds have the merus rather broader than the ischium, the antero-external angle being slightly produced.

The chelipeds are short and slender in the female; longer, stout, with an enlarged and inflated palm, in the adult male.

The abdomen consists of seven segments in the male, and of seven in the female of all except *D. muricata* and *hybrida*.

Key to the Indian species of *Doclea*.

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|--|---|--|--------------------|
| I. Pterygostomian regions distinctly canaliculated fore and aft. | 1. Rostrum elongate—one-fourth to two-fifths the length of the carapace proper, and with the points very widely divaricated: the last lateral and the median posterior spines of huge size..... | <i>D. tetraptera.</i> | |
| | i. Two lateral spines on the branchial region: no median posterior spine.... | <i>D. ovis.</i> not of Herbst
= old form of <i>canaliculifera</i> | |
| | ii. Three lateral spines on the branchial region, the last being short: a short median posterior spine: no spines on the dorsum of the carapace..... | <i>D. japonica.</i> | |
| | iii. Three lateral spines on the branchial region, the last being, like the postero-median spine, long: a line of tubercles, two of which are usually produced to form spines, down the middle of the carapace..... | <i>old form of canalifera</i>
<i>intermediate bet. form above + form below</i>
<i>D. canalifera.</i> | |
| II. Pterygostomian regions not canaliculated. | 1. Carapace discoid: 2nd pair of trunk-legs three to four times the length of the carapace: a single series of tubercles or spines down the middle of the carapace... | <i>D. gracilipes.</i> | |
| | 2. Carapace globular: 2nd pair of trunk-legs hardly twice the length of the carapace: a short series of tubercles or spines on either branchial region parallel to a long mid-dorsal series of tubercles or spines | i. Tubercles, not spines on the carapace..... | <i>D. hybrida.</i> |
| | ii. Spines not tubercles, on the carapace..... | <i>D. muricata.</i> | |

Doclea ovis (Herbst), Edw.*not a new species*

Cancer ovis, Herbst, Krabben, I. ii. 210, tab. xiii. fig. 82; and Fabricius, Syst. Ent. II. 459.

Inachus ovis, Fabricius, Supplement, p. 355.

[*Maia ovis*, Bosc. I. 256]; and Latreille, Hist. Nat. Crust. VI. 100.

Doclea ovis, Milne-Edwards, Hist. Nat. Crust. I. 294.

Doclea ovis, Cuvier, Règne Animal, Crust., pl. xxxiii. fig. 2.

Doclea ovis, Adams and White, Zool. 'Samarang,' Crust., p. 7.

Doclea ovis, A. O. Walker, Journ. Linn. Soc., Zool., XX. 1890, p. 109.

Body and appendages, except the hands and the tips of the dactyli, covered with an extremely dense soft fur.

Beneath the fur the carapace is almost smooth, its surface being hardly broken by a median line of pimples on the gastric region; but its antero-lateral border, on each side, is armed with four sharp teeth of about equal size—one at the angle of the buccal frame; one, which has sometimes a tubercle at its base, on the sub-hepatic region; and two on the front part of the branchial region. The basal antennal joint has also the form of a tooth, and midway between it and the tooth at the outer angle of the buccal frame is another tooth. So that, including the pointed basal antennal joint, the antero-lateral margin of the carapace shows six teeth: there is no spine, though occasionally a trace of a tubercle, on the posterior border.

The rostrum hardly breaks the general subcircular outline of the carapace: it is cleft at the tip, and, measured at the level of the base of the post-ocular tooth, is broader than long.

The pterygostomial region is longitudinally grooved. The chelipeds in the old male are $1\frac{1}{4}$ times the length of the carapace and rostrum, and are enlarged, especially as to the palm, which is $\frac{3}{4}$ as broad as long, and is inflated on the inner side: the fingers also are stout and meet only in (about) the distal third. In the female the chelipeds are only about $\frac{3}{4}$ the length of the carapace and rostrum, and are throughout slenderer than the other legs. The 2nd pair of trunk-legs (first ambulatory legs) are from twice to $2\frac{1}{4}$ times the length of the carapace and rostrum.

The abdomen in both sexes consists of seven distinct segments, and the second segment in the female bears a large median elevation.

A common species in muddy waters in the vicinity of the mouths of the large rivers of India.

Doclea japonica, Ortmann.

Doclea japonica, Ortmann, Zool. Jahrb. Syst., &c., VII. 1893, p. 46, pl. iii. fig. 4.

The only differences between this species and *Doclea ovis* are (1)

is (lost key)
see

that, instead of only two spines on the lateral border of the branchial region, there are *three*, the last being the largest and being placed rather higher up, (so that, including the tooth-like basal antennal joint, there are seven points on the antero-lateral border of the carapace); and (2) that there is a coarse spine, or blunt tooth, on the posterior border of the carapace.

I do not think that these differences are of more than varietal value; for it is not uncommon in *Doclea ovis*, after careful denudation, to find traces of tubercles corresponding to the additional spines of *D. japonica*.

In the Museum collection are specimens from the mouth of the R. Hooghly.

Doclea canalifera, Stimpson.

Doclea canalifera, Stimpson, Proc. Acad. Nat. Sci., Philad., 1857, p. 217.

Body and appendages, except the fingers and dactylopodites, covered with a dense velvet-like tomentum. Carapace subcircular with a line of tubercles or spines down the middle line, namely, some minute tubercles (only visible on the denuded carapace), followed by a spine, on the gastric region; a larger spine on the cardiac region; and a much larger one still on the posterior border: the antero-lateral border is armed with four spines, the first bounding the outer edge of the pterygostomian canal, the last, which is rather larger than the spine of the posterior border, standing near the middle of the branchiostegal border: in addition, there is a small spine at the outer angle of the buccal frame, but no spine between this and the basal antennal joint; and there is a line of extremely faint tubercles, only visible after complete denudation, stretching obliquely on either side from near the front towards the last epibranchial spine.

The rostrum, which is hardly longer than the breadth between the eyes, is sharply and deeply bifid at tip.

The pterygostomian region is longitudinally grooved. The chelipeds (in the young male) are slenderer than the next pair of legs, and are equal to the length of the carapace between the base of the rostrum and the base of the spine on the posterior border. The second pair of trunk-legs, which are the longest, are a little less than twice the length of the carapace and rostrum.

Abdomen of the male seven-jointed.

In the Museum are specimens from the mouth of the Hooghly and from the muddy estuarine coasts of Orissa and of Arakan.

Doclea gracilipes, Stimpson.

Doclea gracilipes, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 216.

Doclea sp. De Man, Mergui Crust., Journ. Linn. Soc., Zool., XXII. 1888, p. 13.

Doclea andersoni, De Man, op. cit., tom. cit., p. 11, pl. i. fig. 1.

Carapace discoidal, covered, as are also the legs as far only as the end of their merus or carpus, with a short close fur.

Rostrum, measured from the posterior orbital border, sometimes as long as broad and about one-seventh the length of the carapace, sometimes twice as long as broad and about one-fourth the length of the carapace; deeply cleft, the spines sometimes convergent, sometimes almost in contact throughout, sometimes slightly divergent.

Besides a line of four teeth, situated one at the end of the basal antennal joint, one at the angle of the buccal frame, and one behind each of these, the antero-lateral margin is armed with four acute curved claw-like spines, the posterior of which is typically two-fifths to one-third the breadth of the carapace in length, but may sometimes be only one-eighth the breadth of the carapace in length; while the three anterior are typically about one-sixth the breadth of the carapace in length, but may sometimes be merely tubercles.

In the middle of the posterior border is a great spine as large as the last spine of the antero-lateral series.

In the middle line of the carapace is a series of tubercles and spines which are very variable in size: typically only two are prominent, and these have the form of upstanding spines, one in the gastric region, the other—much larger—in the cardiac region. Both of them, however, may be reduced to tubercles, while in front of them and also between them there may or may not be a line of tubercles.

Except for this median line of elevations, the dorsum of the denuded carapace is either smooth, or has only a line of extremely indistinct elevations passing on either side obliquely from near the front towards the great lateral epibranchial spine.

The chelipeds in the female are rather shorter than the carapace: in the male they are rather longer than the carapace, and in the adult male have the palms swollen.

The 2nd pair of trunk-legs are between three and four times the length of the carapace measured from the base of the rostrum to the base of the great median posterior spine.

The two spines on the sternum between the bases of the second pair of legs may be distinct or indistinct.

The abdomen consists of seven distinct segments in both sexes.

In this variable species the constant characters are :—

- (1) the discoid (*i.e.*, non-globose) carapace, with elevations only down the middle line :
- (2) the long slender legs of the second pair.
- (3) the large size of the spine at the external angle of the buccal frame.

In the Museum collection are specimens from the Sandheads, R. Hughli; Mergui; Andamans; and also from Hong Kong, whence the species was originally described by Stimpson.

Doclea muricata (Herbst), Edw.

Cancer muricatus, Herbst, Krabben, I. ii. 211, tab. xiv. fig. 83; and Fabricius, Ent. Syst. II. 459.

Inachus muricatus, Fabricius, Supplement, p. 355.

[*Maia muricata*, Bosc, I. 255.]

Doclea muricata, Milne-Edwards, Hist. Nat. Crust. I. 295.

Doclea muricata, Adams & White, 'Samarang' Crustacea, p. 8.

Doclea muricata, E. Nauck, Zeits. Wiss. Zool., XXXIV. 1880, p. 38, (gastric teeth).

Doclea muricata, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl., XXIII. 1888-89, No. 4, p. 43, pl. iv. fig. 5.

Doclea muricata, A. O. Walker, Journ. Linn. Soc., Zool., XX. 1890, p. 109.

Doclea muricata, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 342.

Body and legs, except the hands and dactyli, closely covered with crisp very short velvet.

Carapace subglobular. Rostrum short, distinctly bifid. Besides the spine formed by the basal antennal joint, and two denticles at the outer angle of the buccal frame, the antero-lateral margin is armed with four spines, the last of which, situated near the middle of the branchiostegal border, is considerably the largest. The carapace is traversed fore and aft in the middle line by a row of sharp spines, the last of which, situated on the posterior border, is considerably the largest. Between the median and lateral rows of spines, on the branchial region on either side, are two large spines, one behind the other. There are thus five series of spines upon the carapace, which is otherwise characterized by the distinct delimitation of its regions, and by a sort of festooning of the border between the median and lateral series of regions.

The chelipeds are slender throughout in both sexes, and are hardly equal in length to the carapace measured from the base of the rostrum to the base of the posterior spine: the second pair of trunk-legs are rather more than twice the length of the chelipeds.

The abdomen consists of seven distinct segments in the male; and of four in the female, the 3rd to the 6th being fused.

Of 24 specimens from different parts of India there is not one of great size, nor a single adult female.

I believe that this species is only the young form of *Doclea hybrida*.

Doclea hybrida (Fabr.), Edw.

Inachus hybridus, Fabricius, Supplement, p. 355.

[*Maia hybrida*, Bosc, I. 256]; and Latreille, Hist. Nat. Crust., VI. 99.

Doclea hybrida, Milne-Edwards, Hist. Nat. Crust, I. 294.

Doclea hybrida, Adams and White, 'Samarang' Crustacea, p. 7.

Doclea hybrida, Bleeker, Recherches Crust. Ind. Archipel., p. 9.

Doclea hybrida, De Man, Mergui Crust., Journ. Linn. Soc., Zool., XXII. 1888, p. 9.

Doclea hybrida, Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 342.

? *Doclea hybridoides*, Bleeker, Recherches Crust. Ind. Archipel., p. 8.

This species differs from *Doclea muricata*, only in the following characters, which, I think, are merely due to age:—

(1) it is much larger;

(2) the spine of the antero-lateral series is (except in small females) the smallest, and tubercles are found instead of spines on the dorsal surface of the carapace, the tubercles corresponding in number and position with the spines of *D. muricata*;

(3) the chelipeds in the adult male are nearly as long as the carapace and rostrum, and have the hands enlarged.

As in *D. muricata* the female abdomen consists of four segments.

As Fabricius, *loc. cit.*, says of this species compared with *D. muricata*, *vix distinctus videtur*.

We have 29 good specimens from different parts of India, all being large males and egg-laden females. I think that they can only be the adult stage of *Doclea muricata*.

Doclea tetraptera, A. O. Walker.

Doclea tetraptera, A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 114 pl. vi. figs. 4-8.

Body and legs, except the hands and dactyli, covered with a dense stiff fur, so stiff on the trunk-legs as to give their joints, though cylindrical, a sharply quadrangular or triangular sectional form.

The circular form of the carapace is a good deal obscured by the unusual development of the rostrum and of the lateral-epibranchial and postero-median spines.

The rostrum is from one-fourth to two-fifths the length of the carapace proper, and ends in two widely divaricated spinules.

In addition to the tooth formed by the basal antennal joint, and

to a stout tooth at the angle of the buccal frame, the antero-lateral margin bears four large spines: of these, one, situated on the pterygostomian region, is turned downwards to assist in forming a pterygostomian canal somewhat similar to that of *Doclea canalifera*, etc.: of the other three, which are situated on the branchiostegal region, the last is by far the longest and stoutest—being from one-third to half the length of the carapace—and is directed a little backwards and upwards. Down the middle line of the carapace runs a row of spines, increasing in size from before backwards to the last, which, situated on the posterior border, consists of two branches, one branch directed vertically upwards, the other directed horizontally backwards, the horizontal branch being often half the length of the carapace proper.

On the anterior part of the branchial region, midway between the middle line and the lateral border of the carapace, is a stout spine, visible without any denudation.

The chelipeds in the adult male are equal in length to the carapace and rostrum, and have the hands much broadened, inflated, and very elegantly carinated along the lower border, and the fingers evenly denticulated but not closely apposable in all their extent. In the female the chelipeds are not much more than half as long as the carapace *plus* rostrum and posterior spine, and are rather slenderer than the other legs, the fingers also being closely apposable throughout. In young males, of the size figured by Mr. Walker, the enlargement of the hands is much less marked than in old males.

The second pair of trunk-legs, which are the longest, are from twice to $2\frac{1}{2}$ times the length of the carapace measured from the base of the rostrum to the base of the great postero-median spine.

The sternum in the male has a pair of sharp teeth on its first segment.

The abdomen in both sexes consists of seven separate joints.

Colours in life: dull chocolate, spines white-tipped, chelipeds ivory tinged with pink, legs brownish pink with bright red dactyli.

This species, of which we have a very fine old male, two younger males of different sizes, an adult female, and a young female, appears to be extremely close to *D. calcitrata*, White (Proc. Zool. Soc., 1847, p. 56; Ann. Mag. Nat. Hist., Vol. XX. 1847, p. 61; and 'Samarang' Crustacea, p. 7, pl. i. fig. 2). It appears to differ from *D. calcitrata* only in the proportions of the legs, which are slender and very long in the last-named species.

It may be mentioned that the rostrum and great spines of the carapace are, judging from the state of two of our specimens, liable to be broken and only very imperfectly repaired again.

Our specimens all came from the vicinity of the mouth of the River Hooghly.

Alliance II. LISSOIDA.

HOPLOPHRYS, Henderson.

Hoplophrys, Henderson, Trans. Linn. Soc., Zool., Vol. (2) V. 1893, p. 346.

Carapace subovate (elongate pentagonal), with the regions moderately defined and the surface spinose. The rostrum is composed of two short, flattened, acute, divergent spines. The commencing orbits are formed by a supra-ocular eave which has its antero-external angle very strongly and acutely produced, and which is in close contact with a slightly excavated post-ocular tooth, only a very narrow fissure being left between: below, there is no trace of an orbital floor. The eyes are short, and even when fully retracted the cornea is hardly at all concealed from dorsal view. The basal antennal joint is very acutely triangular, the spinous termination being distinctly visible from above: the very short slender mobile portion of the antenna is exposed. The antero-external angle of the merus of the external maxillipeds forms a foliaceous lobe: the merus therefore is broader than the ischium; the palp is attached to its internal angle. The trunk-legs are strongly spinose: the chelipeds, even in the adult male, are slender, but still differ from those of the female in having the fingers more arched and closely apposable only in the distal half.

The abdomen in the male consists of seven distinct segments; but in the female of only five—the fourth to the sixth being fused together.

Hoplophrys oatesii, Henderson.

Hoplophrys oatesii, Henderson, Trans. Linn. Soc. Zool., 1893, p. 347, pl. xxxvi. figs. 1-4.

The gastric region of the carapace is prominent, with two curved rows of spines, the front row (convex anteriorly) consisting of seven spines of which the middle one is the largest, the back row (slightly convex posteriorly) consisting of three spines of which the middle one—the largest of all the spines on the gastric area—is compressed laterally. On the cardiac area, as well as on the gastric area, are two spines placed side by side. On either branchial area are three spines arranged in a triangle, of which the anterior is the largest of all the spines on the carapace, while the most external, which occupies the lateral epibranchial angle, is the most acute and is also unequally bifid. There are also two or three spinules on the hepatic area. Between the

spines the surface is perfectly smooth and polished, although there are some tufts of stiff clean hairs.

The rostrum, which consists of two very acute and slightly divergent teeth, is about one-fourth the length of the carapace proper.

The supra-ocular eave is produced forwards as a very acute spine, the base of which is surmounted by a secondary spine. The cornea is surmounted by a spinule.

The chelipeds have the merus slightly, and the carpus strongly spiny, and are equal to the carapace (without the rostrum) in length: they are almost alike in the adults of both sexes, the fingers only of the male differing from those of the female in being closely apposable only in the distal half, instead of throughout. The ambulatory legs, which are about equal to the chelipeds and to one another in length, have the merus carpus and propodite spiny, and the dactylus stout, claw-like, and denticulated on part of the posterior margin.

In the Museum collection are an adult male and an egg-laden female taken by myself, off the Ganjam Coast in 15-25 fms., from a colony of *Spongodes*. The *Spongodes* which belongs to a species (I think new) intermediate in character between *S. cervicornis* and *S. pustulosa*, W. and S., is one of those with a brilliant white cœnosarc and pink zooids, so that the crabs with their porcelain-white bodies, pink spines, and pink-banded legs were with difficulty detected.

Dr. Henderson considers the above species to be closely related to *Schizophrys* and *Microphrys*, but it appears to me to be much more closely related to *Pisa* and *Tylocarcinus*.

TYLOCARCINUS, Miers.

Tylocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 664. (*Pisa*, Latr. part.; *Pisa*, Edw. part.; *Milnia*, Stimpson part.; *Microphrys*, Edw. part.)

Carapace tuberculated, pyriform, without lateral spines. The rostrum consists of two slender slightly divergent spines.

The eye-stalks are short and are retractile, but not to such an extent as to completely conceal the cornea. The commencing orbits are formed by a supra-orbital eave, the anterior angle of which is produced forwards as a spine roughly parallel with the rostrum, and of a strongly cupped post-ocular process which, instead of being isolated, is in the closest contact above with the supra-ocular eave and below with the basal antennal joint. The basal antennal joint, which is of no great breadth, has its antero-external angle produced to form a sharp tooth, which is not visible from above: the mobile portion of the antenna, which is short, is completely exposed.

The external maxillipeds have the merus as broad as the ischium, and the palp attached to the internal angle of the merus.

The chelipeds in the adult male are somewhat stouter than the other legs, have the palm short and enlarged, and the fingers arched and meeting only at tip: in the female they are slenderer than the other legs, have the palm slender, and the fingers closely apposable throughout. The ambulatory legs are stout, and have the dorsal surface sharply nodose or coarsely spinose.

The abdomen in both sexes consists of seven distinct segments.

This genus, which appears to me to be but slightly distinct from *Pisa* (e.g., *Pisa corallina*), Riss., shows the transition towards *Tiarinia* in the next group.

That it should be grouped with *Tiarinia* and *Macrocoeloma*, as it is by Miers (*loc. cit.*), I cannot agree, since *Tiarinia* has complete orbits and an enormously broad basal antennal joint, which *Tylocarcinus* has not.

The type of *Tylocarcinus*, namely *T. styx* (Herbst) = *Microphrys styx* A. Milne-Edwards, is placed by the latter author (Nouv. Archiv. du Mus., VIII. 1872, p. 247) between *Picrocerus* and *Criocarcinus* on the one hand and *Hystenus* on the other; and this seems to me to be a very natural position.

Tylocarcinus styx (Herbst).

Cancer styx, Herbst, Krabben, III. iii. 53, pl. viii. fig. 6 ("nur klein").

[*Pisa styx*, Latr. Encyc., X. 141.]

Pisa styx, Milne-Edwards, Hist. Nat. Crust. I. 308.

Arctopsis styx, Adams and White, 'Samarang' Crust, p. 10; and A. Milne-Edwards, in Maillard's L'île Reunion, Annexe F, p. 6.

Milnia styx, Stimpson, Ann. Lyc. Nat. Hist. New York, Vol. VII. 1862, p. 180.

Microphrys styx, A. Milne-Edwards in Archiv. du Mus. VIII. 1872, p. 247, pl. xi. fig. 4.

Tylocarcinus styx, Miers, Ann. Mag. Nat. Hist. 1879, Vol. IV. p. 14.

Pisa styx, Richters, Möbius, Meeresf. Maurit., p. 141.

Tylocarcinus styx, de Man, Notes Leyden Mus., Vol. III. 1881, p. 94; and Archiv. fur Naturges. LIII. 1887, p. 228; and Ortmann, Zool. Jahrb. Syst. etc. VII. 1893, p. 62; and Henderson, Trans. Linn. Soc., Zool., 1893, p. 349.

Carapace subpyriform and covered with rounded tubercles, among which the following are distinct:—two in the inter-orbital space; four in a transverse series on the front part of the gastric region, followed by three in a triangle; one in the groove between the gastric and cardiac regions, and three in a triangle on the latter region; two, side by side, on the intestinal region; and three on the posterior margin. Besides these there are several on either hepatic region, and many on the branchial regions.

The rostrum, which is between one-third and one-fourth the length of the carapace proper, consists of two divergent spines fused together at the base and slightly incurved towards the tip. The anterior angle of the supra-ocular eave is produced forwards as a sharp spine.

The chelipeds in the adult male are equal to the length of the carapace behind the bifurcation of the rostral spines: they are hardly stouter than the other legs, except as to the palm, which is short and inflated: the fingers, which are three-fourths the length of the palm, are strongly arched, and meet only at the tip.

In the female the chelipeds are not quite as long as the post-orbital portion of the carapace, are slenderer than the other legs, and have the palm slender and the fingers closely apposable throughout.

The ambulatory legs are short and stout: the first pair, which are considerably the longest, are rather longer than the carapace and rostrum: the merus and carpus in all are nodose on the dorsal surface, and the dactyli are strong and claw-like: always in the first pair, and sometimes in the succeeding pairs, the merus has a row of coarse spines along its front margin, and the carpus a single stout spine.

Herbst's figure is either a young male, or, more probably, a female. The figure given by A. Milne-Edwards (*loc. cit.*) is very correct; but I do not see how Miers, who cites this figure with affirmation, can call the chelipeds in the male slender: they are, like the other legs, stout, and the hands are distinctly massive.

In the Museum collection are specimens from Ceylon, from the Andamans, and from Mergui; as well as an adult male and female from Samoa obtained from the Museum Godeffroy.

Sub-family IV. MAIINÆ.

Eyes either (1) with orbits, which are either incomplete or complete, but are always complete enough to entirely conceal the cornea, when fully retracted, from dorsal view; or (2) but partially protected by a huge horn-like or antler-like supra-ocular spine, or by a large jagged post-ocular tooth, or by both.

The orbit in the first case is formed in one of two ways: there is always an arched supra-ocular eave, and a prominent post-ocular spine; and either the interval between the eave and the spine is filled by an intermediate spine which completes the orbital roof; or the supra-ocular eave and the post-ocular process are in close contact with one another, and with a process of the basal antennal joint below, so as to more or less complete the floor also of the orbit.

The basal antennal joint is always very broad, and either has its outer angle produced to aid in forming the floor of the orbit, or is armed distally with one or two large spines.

The external maxillipeds have the merus as wide as or much wider than the ischium, and the palp inserted at the antero-internal angle of the merus.

The rostrum is formed of two spines, which may be horizontal, semi-deflexed, or completely deflexed; in the last case the spines are usually more or less fused together.

The ambulatory legs are of no great length.

Key to the Indian genera.

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| <p>Alliance 1. MAIOPIDA.—Carapace either regularly pyriform or sub-circular: rostral spines horizontal: orbits incomplete below; but fairly well roofed in above (1) by a supra-ocular eave, which has at least its postero-external angle produced, (2) by a post-ocular spine, and (3) by a spine intercalated between (1) and (2).</p> | <p>1. Supra-ocular eave and intermediate spine very prominent: eye-stalks slender and curved, with the cornea elongate and occupying a position more ventral than terminal.</p> <p>2. Supra-ocular eave and intermediate spine distinct, but not very prominent: eye-stalks stout, with rounded cornea which occupy a position as much terminal as ventral.</p> | <p>i. The antennary flagellum springs, or appears to spring, from within the orbit.....</p> <p>ii. The antennary flagellum arises quite clear of the orbit.....</p> <p>i. Carapace pyriform: rostral spines of considerable length, and with one or more accessory spines on the outer surface.....</p> <p>ii. Carapace sub-circular: rostral spines simple, and so short as to hardly break the general outline of the carapace.....</p> | <p>MAIA.</p> <p>PARAMITHRAX.
[CHLORINOIDES.]</p> <p>SCHIZOPHRYS.</p> <p>CYCLAX.</p> |
| <p>Alliance 2. STENOCIONOPOIDA.—Carapace pyriform, often broadened anteriorly: the orbits either have the form of long semitubular antlers which sheathe the eye-stalk, but do not protect the eye, the cornea in retraction being protected by the base of an extremely long and prominent, isolated, post-ocular horn; or are reduced to the form of long outstanding horns similar to those of the rostrum: eye-stalks extremely long: the external maxillipeds have the external angle much produced: the rostrum consists of two long horns.</p> | <p>1. Orbits in the form of huge semi-tubular antlers followed by a long isolated post-ocular tooth: rostrum vertically deflexed: buccal frame much broader in front than behind.</p> <p>2. Orbits in the form of long outstanding horns similar to those of the rostrum, which is not deflexed, buccal frame quadrangular.....</p> | <p>CRIOCARCINUS.</p> <p>STENOCIONOPS.</p> | |

- Alliance 3. PERICEROIDA. — Carapace- usually broadened anteriorly by the outstanding orbits: the orbits are either nearly or quite complete above and below, being formed by a strongly-arched supra-ocular eave in close contact with an excavated post-ocular lobe, a process of the basal antennal joint filling in the floor below.
1. Carapace oblong: rostrum broadly laminar, vertically or nearly vertically deflexed: orbits complete, but shallow.. MICIPPA. 248
 2. Carapace subcylindrical, the rostrum along with the front part of the gastric region vertically deflexed..... CYPHOCARCINUS. 252
 3. Carapace more or less pyriform: rostral spines distinct from the base, horizontal or slightly deflexed: orbits in the form of outstanding tubes which completely ensheath the eyes.
 - i. Rostral spines divergent..... MACROCOELOMA. 25
 - ii. Rostral spines parallel and closely approximated throughout their extent..... TIARINIA. 256

Alliance I. MAIOIDA.

MAIA (Lamk.) Edw.

[*Maia*, Lamarck, Syst. Anim. sans verteb. V. 154 (*partim*).]

Maia, Latreille, Hist. Nat. Crust. VI. 87 (*partim*).

Maia, Desmarest, Consid. Gen. Crust., p. 143.

Maia, Milne-Edwards, Hist. Nat. Crust., I. 325.

Maia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 655.

Carapace pyriform, with the regions indistinct, the surface closely granular or spinular, and the lateral borders usually armed with large spines. The rostrum consists of two rather short, straight, divergent spines. The basal joint of the antennæ is broad, and has both the antero-external and antero-internal angle produced to form spines: the mobile portion of the antenna, which appears to spring from within the orbit, is completely exposed. The eye-stalks are long and curved, and bear the cornea chiefly on their ventral surface. The orbit is formed by a prominent supra-ocular eave which has its postero-external angle produced, by a sharp post-ocular spine, and by another spine between these two: the eyes are completely concealed from dorsal view when retracted. The external maxillipeds have the merus as broad as the ischium, the palp being attached to the antero-internal angle of the merus.

The chelipeds are slender, with cylindrical joints and styliform fingers. The ambulatory legs decrease very gradually in length: the first pair are not much longer than the carapace and rostrum: the dactyli of all are styliform.

The abdomen in both sexes consists of seven distinct segments.

Maia spinigera, de H.

Maia spinigera, de Haan, Faun. Japon. Crust., p. 93, pl. xxiv. fig. 4.

Maia spinigera, Adams and White, 'Samarang' Crustacea, p. 15.

Maia spinigera, Dana, U. S. Expl. Exped. Crust., pt. I. p. 85.

Maia spinigera, Ortmann, Zool. Jahrb. Syst. &c., VII. 1893, p. 51.

Carapace armed with long spines along the antero-lateral borders, down the median line, and in an oblique series on either branchial region joining the median to the antero-lateral series. Excluding the pre-ocular and post-ocular spines and the spines between them, there are four large spines on the antero-lateral border: and there are three large spines in an oblique series on either branchial region. In the middle line of the carapace there are in the gastric region two spines, in the anterior cardiac one, in the post-cardiac one, in the intestinal one, and on the posterior border a pair. Between these large spines the surface of the carapace is sharply, finely, and evenly granular.

The rostrum consists of two moderately divergent spines, the length of which is about one-fourth that of the carapace.

The chelipeds are smooth and very slender, and are rather shorter than the 2nd pair of trunk-legs: the latter, which are the longest of all, are about one-sixth longer than the carapace and rostrum. The merus of all the ambulatory legs has a strong spine at the distal end of its upper border: all the joints of all the ambulatory legs are covered with long hairs.

In the Museum collection is a single specimen from the coast of Beluchistán.

Maia gibba, n. sp. Plate IV. fig. 5.

Very near *Maia miersii*, Walker (J. L. S., Zool., Vol. XX. 1890, p. 113, pl. vi. figs. 1-3).

Distinguished (1) by the globose inflation of the posterior (branchiostegal) part of the closely and crisply tubercular carapace, and by the corresponding declivity of the anterior part, giving the animal a hunch-backed appearance; (2) by the absence of large marginal spines on the carapace.

Carapace remarkably swollen in its posterior part, where its greatest breadth is from about three-fourths (σ) to seven-eighths (φ) its extreme length with the rostrum; and closely covered with sharp piliferous tubercles, which, in the male, but hardly in the female, become spinular in the middle line and along the lateral borders.

The rostrum, which, like the anterior part of the carapace, is somewhat declivous, ends in two acute divergent hairy spines, which in the

male are about one-sixth, in the female about one-eighth, the rest of the carapace in length. The eyes and orbits are just as in *M. squinado* (with specimens of which this species has been compared), only the cornea is relatively very much larger, and almost entirely ventral, in the present species, and the spine between the spine of the pre-orbital hood and the post-orbital spine is nearly as large as either of these.

The antennæ are in all respects as in *M. squinado*, except that the basal joint is slightly narrower.

The appendages are just as in *M. squinado*—the legs being short and hairy and the chelipeds smooth and polished—with the single difference that the chelipeds are only as long as, and are much slenderer than the *fifth* pair of legs, and are therefore very much shorter than the second pair, which hardly exceed the carapace and rostrum in length.

		Male.	Female.
Length of carapace	... ..	32 millim.	41 millim.
Greatest breadth of carapace	... ..	25 "	35 "
Length of chelipeds	... ..	24 "	31 "
" " 2nd pair of trunk-limbs	... ..	33·5 "	46 "

Loc. Audaman Sea, 250 fms.

PARAMITHRAX, Edw.

Paramithrax, Milne-Edwards, Hist. Nat. Crust. I. 323.

Paramithrax (*Paramithrax* et *Leptomithrax*), Miers, Journ. Linn. Soc. Zool., Vol. XIV. 1879, pp. 655 and 656.

Acanthophrys (partim), A. Milne-Edwards, Ann. Soc. Ent. Fr. (4) V. 1865. p. 140.

Chlorinoides, Haswell *infra*; and Miers *infra*.

Sub-genus CHLORINOIDES, Haswell.

Chlorinoides, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 442; and Ann. Mag. Nat. Hist., Vol. V. 1880, p. 146; and Cat. Austral. Crust., p. 17.

Chlorinoides, Miers, 'Challenger' Brachyura, p. 51.

Carapace pyriform, convex, with the regions indistinct; armed with some very large acute spines. The rostrum consists of two long slender divergent horns. The basal antennal joint is just as in *Maia*, but the mobile portion of the antenna has no connexion with the orbit. The eyes and orbits are as in *Maia*, but the supra-ocular hood has its anterior angle as well as its posterior angle produced into a spine. The external maxillipeds are as in *Maia*, as are also the ambulatory

legs. The chelipeds however differ, at any rate in the male, in which sex they are stouter than any of the other legs, have the palms enlarged, and the fingers arched and meeting only at the tips, which are not excavated.

The abdomen in both sexes consists of seven distinct segments.

As Miers has pointed out ('Challenger' Brachyura, p. 52), *Chlorinoides* may be regarded as a sub-genus of *Paramithrax*, and is also closely connected with *Acanthophrys aculeatus* A. Milne-Edwards (Ann. Soc. Ent. Franc. (4) V. 1865, p. 140, pl. iv. fig. 4). According to Miers, with whom I entirely agree, if *Acanthophrys aculeatus* is the type of the genus *Acanthophrys*, then *Chlorinoides* is synonymous with *Acanthophrys*.

Paramithrax (Chlorinoides) aculeatus, (Edw.).

Chorinus aculeata, Milne-Edwards, Hist. Nat. Crust. I. 316.

Chorinus aculeatus, Adams and White 'Samarang,' Crust., p. 13.

Paramithrax (Chlorinoides) aculeatus, var. *armatus*, Miers, Zool. H. M. S. 'Alert,' pp. 182 & 193, pl. xviii. fig. A.

Chlorinoides aculeatus, Miers, 'Challenger' Brachyura, p. 53.

Chorinus aculeatus, C. W. S. Aurivillius, Kongl. Sv. Vet. Akad. Handl., Bd. XXIII. No. 4, p. 38, pl. ii. fig. 7.

Chlorinoides aculeatus, Henderson, Trans. Linn. Soc., Zool., 1893, p. 345.

Carapace pyriform, convex, smooth, armed with five huge thorn-like spines down the middle line, and with two even larger spines on the branchial region: there are also, on either pterygostomian region, two oblique crests, the anterior with three or four teeth—two of which are visible in a dorsal view—the posterior with one or two.

The rostrum consists of two large divergent horns, the length of which is considerably more than half that of the carapace proper.

The orbit consists of a supra-ocular hood, the angles of which (especially the anterior) are strongly produced, of a bilobed post-ocular tooth, and of a long spine filling the interval between the two, just as in *Maia spinigera*. The basal antennal joint, as in most of the forms included in this group, has a strong spine at its antero-external, and another at its antero-internal angle.

The chelipeds in the female are slender, and are only equal to the post-rostral portion of the carapace in length: as in the male, the merus has its crest-like upper and lower edges sharply scalloped and the carpus is cristate above. In the male the chelipeds are stouter than the other legs, especially as to the palm, which is considerably enlarged. The ambulatory legs decrease gradually in length from the 1st pair, which are equal in length to the carapace plus two-thirds of the rostrum: the merus in the first two pairs has a very strong spine at the

distal end of its upper border ; but this in the case of the last two pairs is often reduced to a tubercle.

The body and legs in this species are somewhat hairy and are more or less encrusted with sponges, zoophytes, polyzoa, etc.

In the Museum collection are specimens from the Arakan Coast, Mergui, and Ceylon.

Paramithrax (Chlorinoides) longispinus (de Haan).

Maja (Chorinus) longispina, de Haan, Faun. Japon., Crust., p. 94, pl. xxiii. fig. 2.

Chorinus longispina, Adams and White, 'Samarang' Crust., p. 12.

Paramithrax (Chlorinoides) longispinus, Miers, Zoology H. M. S. 'Alert,' pp. 517 and 522.

Chlorinoides longispinus, Miers, 'Challenger' Brachyura, p. 53.

Chlorinoides longispinus, A. Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 53.

This species differs from *P. aculeatus* in the following constant characters :—

- (1) it is a much smaller species ;
- (2) all the spines, including the rostral spines, are elegantly knobbed at tip ;
- (3) in the median line of spines the third—the one on the cardiac region—is cleft transversely into two from the base ;
- (4) the two oblique dentate ridges on the pterygostomial region are present, but the outermost tooth on the front ridge is produced to form a long spine ;
- (5) the spine at the anterior angle of the supra-ocular hood is similar in size, form, and direction to the other large spines of the carapace ;
- (6) the rostral spines are less than half the length of the carapace ;
- (7) the antero-external angle of the basal antennal joint is produced to form, not a spine, but an elegantly curved foliaceous lobe ;
- (8) the meropodites of all the ambulatory legs have the terminal spine distinct and knobbed at the tip.

This species commonly encrusts itself with a very regular plate-armour of Orbitolites and rounded fragments of Nullipore, etc.

In the Museum collection are good series from off Ceylon 33–34 fathoms, from the Andaman Sea down to 41 fathoms, and from the Madras Coast.

SCHIZOPHRYS, White.

Schizophrys, White, Ann. Mag. Nat. Hist., Vol. II. 1848, p. 282.

Schizophrys, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 660 (*et synonym.*); and 'Challenger' Brachyura, p. 66.

Dione, de Haan, Faun. Japon. Crust., p. 82.

Carapace broadly pyriform, with the surface granular and the lateral margins strongly spinate. The rostrum consists of two short stout slightly incurved spines, the outer border of which carries one or two accessory spines. The orbit is formed by a little-prominent supra-ocular eave, and a sharply bilobed post-ocular tooth, with a broad spine in the interval between the two: the eye-stalks are stout and the cornea terminal, not ventral, in position. The basal antennal joint is somewhat narrowed anteriorly, and ends in two sharp spines—as in the genera immediately preceding: the mobile portion of the antenna is freely exposed. In the external maxillipeds the merus is rather broader than the ischium, and the palp is attached to the antero-internal angle of the merus.

The chelipeds have the merus and carpus granular or spiny; the palm long, smooth and slender; and the fingers longitudinally channelled in their distal half—this being specially marked in the adult male, in which also the chelipeds are longer and stouter than the other legs.

The ambulatory legs are stout, have cylindrical joints, and decrease gradually in length.

The abdomen in both sexes consists of seven distinct segments.

Schizophrys aspera, (Edw.)

Mithrax asper, Milne-Edwards, Hist. Nat. Crust., I. 320; and Dana, U. S. Expl. Exp. Crust., pt. I. p. 97, pl. ii. figs. 4 a-b.

Schizophrys aspera, A. Milne-Edwards, Nouv. Archiv. du Mus. VIII. 1872, p. 231, pl. x. fig. 1; and Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 447; and Cat. Austr. Crust., p. 22; and Miers, Zool. H.M.S. 'Alert,' pp. 182 and 197, and 'Challenger' Brachyura, p. 67; and De Man, Archiv. für Naturgesch., LIII. 1887, p. 226, and Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 20; and C. W. S. Aurivillius, Kongl. Sv. Vet. Akad., Handl. XXIII. 1888-89, No. 4, p. 51; [and Cano, Boll. Soc. Nat., Napol., III. 1889, p. 179]; and A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, pp. 109 and 113; and Ortmann, Zool. Jahrb. Syst., etc., VII. 1893, p. 57; and J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 346; and Mary J. Rathbun, Proc. U. S. Nat. Mus., Vol. XVI. 1893, p. 91.

Schizophrys serratus, White, P. Z. S., 1847, p. 223, fig.; and Ann. Mag. Nat. Hist., Vol. II. 1848, p. 283, fig.; and Adams and White, 'Samarang' Crust., p. 16.

Schizophrys spiniger, White, *l. cit.*; and Adams and White *loc. cit.*; and P. Kossmann, Reise Roth. Meer., Crust., p. 15.

Maja (Dione) affinis, de Haan Faun. Japon. Crust., p. 94, pl. xxii. fig. 4; and Adams and White, 'Samarang' Crust., p. 15; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 218.

Mithrax spinifrons, A. Milne-Edwards, Ann. Soc. Ent., France, (4) VII. 1867, p. 263.

Mithrax affinis, F. de B. Capello, Journ. Sci., Lisbon, 1870-71, p. 264, pl. iii. figs. 4, 4a.

Mithrax (*Schizophrys*) *affinis*, *triangularis* (et varr. *excipe* var. *dichotoma*) Kossmann, Reise Roth. Meer., Crust., pp. 11 and 13; and *Schizophrys triangularis* var. *indica*, Richters, Möbius, Meeresf. Maurit., p. 143, pl. xv. figs. 8-14.

Carapace pyriform, its greatest breadth about $\frac{9}{10}$ its length behind the point of bifurcation of the rostral spines, its surface closely and unevenly granular, with scattered sharp tubercles in addition. Exclusive of the large unequally-bifid post-ocular spine, the antero-lateral border is armed with six equidistant spines, the last of which is the smallest and is situated on a rather higher level than the others: the posterior border proper is generally beaded, and has its angles produced and upturned.

The rostrum consists of two stout parallel or incurved spines, the length of which is from one-fifth to one-sixth that of the carapace proper, and the outer border of each of which carries a strong accessory spine.

The basal antennal joint ends in two stout spines, and there is a spine on the sub-hepatic region outside the angle of the buccal frame, and a sharp denticle in the middle of the inferior border of the orbit.

The chelipeds vary: in both sexes the palm is long—twice the length of the fingers—smooth, polished, and either quite unarmed, or armed, at the near end of the upper border, with a spine or with two or three denticles; and in both sexes the merus and carpus are either spiny or granular.

But whereas in old males the chelipeds are stouter than any of other legs, are more than half again as long as the carapace and rostrum and nearly half again as long as the 2nd pair of legs, and have deeply channelled fingers that meet in less than their distal half; in females and young males they are not stouter than the other legs, are not quite equal in length to the carapace and rostrum or to the second pair of legs, and have the fingers less deeply channelled, and appposable in at least half their extent.

The ambulatory legs decrease very gradually in length: they have short claw-like dactyli, and the merus is armed at the far end of the upper border with a spine or tubercle. The body and legs are hairy, and the animal frequently protects itself with flat pieces of Nullipore, &c.

In the collection is a large series of specimens from all parts of the Indian coast, from Mergui and Tavoy on the East to Karáchi on the West.

Schizophrys dama, (Herbst.)

Cancer dama, Herbst, Krabben, III. iv. p. 5, tab. lix. fig. 5.

Mithrax dama, Milne-Edwards, Hist. Nat. Crust., I. 319.

Mithrax (Schizophrys) dama, Kossmann, Reise Roth. Meer., Crust., pp. 11 and 13.

This species differs constantly from *Schizophrys aspera* in the following particulars:—

- (1) the carapace is much more elongate, its greatest breadth being only about $\frac{3}{4}$ its length behind the point of bifurcation of the rostral spines;
- (2) the rostrum is rather longer, and has two accessory spines on its outer border;
- (3) there is no (ventral) spine on the sub-hepatic region;
- (4) the surface of the carapace is more closely and evenly, but more bluntly, granular.

The specimens in the Museum collection come from the Straits of Malacca.

CYCLAX, Dana.

Cyclax, Dana, U. S. Expl. Exp., Crust., pt. I. p. 99.

Cyclomaia, Stimpson, Amer. Journ. Sci. and Arts, Vol. XXIX. 1860, p. 133; and A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 235 (*et synonym.*)

Cyclax (Cyclax and Cyclomaia), Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 660.

This genus differs from *Schizophrys*, from which, perhaps, it ought not to be separated, only in the form of the carapace, and in the degradation and shortening of the rostrum, with which is correlated a shortening and broadening of the basal antennal joint. (In one species the legs are slender). The carapace is subcircular; the rostrum obsolescent and bifid; the basal antennal joint very short and broad, and armed with a third spine—a very small one, situated on the outer margin.

Cyclax (Cyclomaia) suborbicularis, (Stimpson).

Mithrax suborbicularis, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 218.

Cyclax spinicinctus, Heller, Crust. Roth. Meer. in SB. Ak., Wien, XLIII. i. 1861, p. 304, tab. i. figs. 7-8: and Richters, in Möbius, Meeresfauna Maurit., p. 144.

Cyclomaia margaritata, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 236, pl. x. figs. 2-3; and Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, [p. 441, and Cat. Austral. Crust., p. 21.

Cyclomaia suborbicularis, Ortmann, Zool. Jahrb., Syst., etc., VII. 1893, p. 53.

[*Cyclomaia margaritata*, F. Muller, Verh. Ges., Basel, VIII. p. 473.]

Carapace subcircular, its surface closely beaded, with some larger spinules regularly interspersed: the lateral margin is armed with six

large spines (exclusive of the large curved unequally-bifid post-ocular spine) the first of which is often bifid: close to the posterior margin, in the middle line, is a pair of smaller spines.

The rostrum consists of two triangular teeth, which although broader are not longer than the spines of the lateral margin.

The eyes are of moderate length and are retractile into orbits formed, as in *Schizophrys*, *Maia*, etc., of a supra-ocular eave, a large post-ocular spine, with another spine in the interval between the two: the supra-ocular eave has its angles slightly produced and spiniform.

The broad short basal antennal joint ends in two stout teeth, and has a third denticle on its outer margin.

The chelipeds in the female and young male are slightly more slender than the other legs, and are as long as the carapace or as the 2nd pair of trunk-legs *minus* the dactylus: they have a long slender smooth palm, nearly twice the length of the fingers. The ambulatory legs are hairy, have short claw-like dactyli, and decrease gradually in length.

In the Museum collection are specimens from the Madras coast and from the Andamans.

Alliance II. STENOCIONOPOIDA.

CRIOCARCINUS, Edw.

Criocarcinus, Milne-Edwards, Hist. Nat. Crust., I. 331.

Criocarcinus, Miers, Journ. Linn. Soc., Zool., Vol. XVI. 1879, p. 661.

Carapace shaped and armed much as in *Ohlorinoides*, but with the hepatic regions concave as in *Micippe*. The rostrum consists of two curved almost vertically deflexed spines, which are fused together in their basal half. The eye-stalks are slender and of extreme length. The orbit is formed of a semi-tubular branching supra-ocular hood which encloses the eye-stalk, and of a long slender post-ocular spine, against the base of which the eye is retractile: the supra-ocular hoods have the appearance of a pair of antlers. The basal antennal joint is broad, and has a strong spine at either anterior angle: the mobile portion of the antenna is freely exposed.

The buccal frame is narrow behind and broad in front, as in *Micippe*; and the merus of the external maxillipeds is broader than the ischium, and carries the palp at its deeply-notched internal angle.

The chelipeds are shorter, and in the male somewhat stouter but in the female somewhat slenderer, than the other trunk-legs, which again are of no great length and decrease gradually from the 2nd pair.

The abdomen consists of seven distinct segments in the male, of five in the female.

Criocarcinus superciliosus (Herbst), Guérin, Edw.

Seba, III. xviii. 11: Linnæus, Syst. Nat., I. 2, 1047, No. 45.

Cancer superciliosus, Herbst, Krabben, I. ii. 227, tab. xiv. fig. 89.

Criocarcinus superciliosus, Guérin, Voy. Coquille, Zool., Vol. II. Crust., p. 19.

Criocarcinus superciliosus, Milne-Edwards, Hist. Nat. Crust., I. 332.

Criocarcinus superciliosus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 242, pl. xii. fig. 3.

Criocarcinus superciliosus, Kossmann, Reise Roth. Meer., Crust., p. 10, tab. iii. fig. 6 (*vide synon.*).

Carapace pyriform, broadened anteriorly by the antler-like "orbits," with the hepatic regions sunken, and the other regions fairly distinct: in addition to numerous pearly tubercles, which are tufted with curly bristles, the carapace is armed with several large knob-tipped spines, namely two in the middle line on the gastric region, one in the middle line on the posterior border, one on either side near the boundary of the hepatic and branchial regions, and one, directed obliquely backwards, near the middle of either branchial region.

The rostrum consists of two vertically deflexed spines, the bases of which are broadened and fused together, and the points of which are divergent and elegantly curved.

The eyes and orbits have already been described in a general way: the long semi-tubular supra-ocular hood ends in three diverging tines, and the long post-ocular spine has its anterior border armed with two or three denticles.

The external maxillipeds have the outer edge thin and sharp, the outer edge of the ischium being emarginate, and the outer angle of the merus being produced.

The chelipeds are shorter than the other trunk-legs, and are about as long as the carapace behind the level of the post-ocular spine. In the male they are slightly stouter than the other legs, and have the palm a little swollen: in the female they are slenderer than the other legs, and have the palm slender and a little tapering.

Of the ambulatory legs, which are hairy, the first two pairs are slightly the longest, both being rather less than one-third longer than the post-rostral portion of the carapace: the last two pairs are not much shorter.

In the Museum collection are specimens from the Andaman Islands.

STENOCIONOPS, Latr.

[*Stenocionops*, Latreille, R. A., (2) IV. 59.]

Stenocionops, Milne-Edwards, Hist. Nat. Crust., I. 337.

"Carapace narrow, uneven, and armed posteriorly with a large triangular prolongation which covers the base of the abdomen. The

rostrum is formed of two styliform divergent horns. The supra-ocular border is armed with a horn similar to those of the rostrum, but directed more obliquely. The eye-stalks are slender, immobile and extremely salient; their length is half the greatest breadth of the body. The first joint of the antennæ is much longer than broad, the second is slender and is inserted beneath the rostrum.

The epistome is nearly square, and the external maxillipeds have the merus extremely dilated at the antero-external angle, and excavated at the antero-internal angle. The trunk-legs, in the female, are slender and cylindrical: those of the first pair (chelipeds) are hardly stouter and are much shorter than the second, which latter are a little longer than the carapace and rostrum: the others diminish very gradually in length: all the ambulatory legs have sharp, recurved dactyli. The abdomen of the female consists of five segments, the 4th, 5th and 6th segments being fused together." (Edw.)

Stenocionops cervicornis (Herbst).

Cancer cervicornis, Herbst, Krabben, III. iii. 49, pl. lviii. fig. 2.

[*Stenocionops cervicornis*, Guérin, Icon. Regne An., Crust., pl. 8 bis, fig. 3].

Stenocionops cervicornis, Milne-Edwards, Hist. Nat. Crust., I. 338.

Stenocionops cervicornis, Cuvier, Regne Animal, Crust., pl. xxxi. fig. 1.

Stenocionops cervicornis, and ? *curvirostris*, A. Milne-Edwards, Ann. Soc. Ent., France, (4) V. 1865, p. 135 (pl. v. figs. 1-1e.)

Stenocionops cervicornis, E. Martens, Verh. zool. bot. Ges., Wien, XVI. 1866, p. 379.

[*Stenocionops cervicornis*, Cano, Boll. Soc. Nat., Napòl., III. 1889, p. 177.]

Stenocionops cervicornis, Henderson, Trans. Linn. Soc., Zool., 1893, p. 343.

"Carapace uneven and tuberculated: rostral and supra-ocular horns slender, very long, and nearly co-equal: two large conical elevations on the sides of either hepatic region: antennæ shorter than the rostrum: chelæ finely toothed and a little incurved: legs smooth." (Edw.)

Alliance III. PERICEROIDA.

MICIPPA, Leach.

Micippa, Leach, Zool. Miscell., III. p. 16.

Micippe, Desmarest, Consid. Gen. Crust., p. 148.

Micippa, Milne-Edwards, Hist. Nat. Crust., I. 329.

Micippa, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 661; Ann. Mag. Nat. Hist., Vol. XV. 1885, p. 3; and 'Challenger' Brachyura, p. 69.

Carapace nearly oblong, depressed, rounded behind, broadened anteriorly, and ending at a broad, lamellar, more or less vertically

deflexed rostrum, the tip of which is cleft or emarginate. The eye-stalks are long, and the corneæ, which are rather ventral than terminal in position, can be completely retracted from dorsal and usually also from ventral view. The orbit is formed by a sharply-arched supra-ocular eave, which is in contact either with an excavated post-ocular spine or with an intercalated spine as in *Maia*, and is partly or entirely completed below and in front by a process of the broad basal antennal joint. The mobile portion of the antenna is completely exposed.

The buccal frame is broadened in front: the merus of the external maxillipeds is broader than the ischium, and has its external angle expanded and its internal angle notched for the insertion of the palp.

The chelipeds in the adult male are as long as or a little longer than the carapace, are a little stouter than the other legs, and have the palm broader than the other joints, and the fingers arched to meet only at the tip. The chelipeds in the female are slenderer than the other legs, are about the same length as the carapace, and have slender palms and almost straight fingers. The ambulatory legs are moderately elongate, subcylindrical, and have the dactyli not much or not at all shorter than the propodites.

Abdomen, in both sexes, seven-jointed.

Key to the Indian species of Micippa.

- I. Rostrum very broad, ending in four sharp lobes or spines
(i.e., each lobe of the rostrum bilobed)..... *M. philyra*.
- II. Rostrum moderately broad, ending in two long sharp lobes
or spines (i.e., each lobe of the rostrum simple), not
inflexed at tip..... *M. thalra*.
- III. Rostrum moderately broad, inflexed at tip; ending in two
insignificant blunt lobes, each of which has a small
tooth at its external angle:—
 1. Three large pearl-like tubercles embedded
in the posterior margin..... *M. margaritifera*.
 2. Two small pearl-like tubercles embedded
in the posterior margin, with a group of
small spinules between them..... *M. margaritifera*
var. *parca*.

Micippa philyra, (Herbst;) Leach.

Cancer philyra, Herbst, Krabben, III. iii. p. 51, pl. lviii. fig. 4.

Micippa philyra, Leach, Zool. Miscell., III. 16; and Desmarest, Consid. Gen. Crust., p. 149, pl. xxii. fig. 2; and Guérin, Icon. R. A., pl. viii bis, fig. 1; and Milne-Edwards, Hist. Nat. Crust., I. 330; and Adams and White, 'Samarang' Crust., p. 15; and A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 239, pl. xi. fig. 2 and KOSSMANN, REISE ROTH. MEER., CRUST., p. 6 (*ubi synonym.*); and varr. *platipes* and

mascarenica, pl. iii. figs. 2-3; and Richters, Möbius, Meeresfauna, Mauritius, p. 143, pl. xv. figs. 6-7, and var. *latifrons*, p. 142, pl. xv. figs. 1-5; and Lenz and Richters, Abh. senck. Ges. XII. 1881, p. 421; and Miers, Zoology H. M. S. 'Alert,' pp. 182 and 198, and Ann. Mag. Nat. Hist., 1885, Vol. XV. p. 6, and 'Challenger' Brachyura, p. 69; and Ortmann, Zool. Jahrb. Syst., &c., VII. 1893, p. 59; and J. R. Henderson, Trans. Linn. Soc., Zool., 1893, p. 348.

Micippe platipes, Rüppell, Beschrib. und Abbild., 24 Krabben Roth. Meer., Frankfort, 1830, p. 8, tab. i. fig. 4; and Milne-Edwards, Hist. Nat. Crust., I. 333 (*Paramicippe*); and Heller, Crust. Roth. Meer., SB. Ak., Wien, XLIII. 1861, p. 299, tab. i. fig. 2; and De Man, Archiv. fur Naturgesch., LIII. 1887, p. 227 (*Paramicippe*).

Micippe bicarinata, Adams and White, 'Samarang' Crust., p. 16, (sec. Kossmann and Miers).

? *Micippe hirtipes*, Dana, U. S. Expl. Exp., Crust., pt. I. p. 90, pl. i. figs. 4 a-e; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 218; and Heller, Reise 'Novara,' Crust., p. 3.

Micippa spatulifrons, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 240, pl. xi. fig. 3; and Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 445, and Cat. Austral. Crust., p. 24.

Micippa mascarenica, Kossm., Miers, Ann. Mag. Nat. Hist., 1885, Vol. XV. p. 7, and 'Challenger' Brachyura, p. 69; and A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109; and J. R. Henderson, Trans. Linn. Soc., Zool., 1893, p. 348.

Micippa superciliosa, Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 446, pl. xxvi. fig. 2, and Cat. Austral. Crust., p. 25.

Paramicippa asperimanus, Miers, Zoology H. M. S. 'Alert,' pp. 517 and 525.

Body and ambulatory legs closely covered by a woolly tomentum. Carapace with the regions well defined by smooth sulci, the hepatic regions sunken and pinched in, the surface closely and unevenly granular: the lateral margins are armed with knob-tipped spinules, of which there are sometimes as many as six, sometimes as few as two, on either side.

The rostrum consists of a broad lamina which in the female is quite vertically, but in males is not so much deflexed, its sides are gently sinuous, and it ends in four sharp-cut lobes. The eyes are completely retractile within the orbits.

The basal antennal joint is short and is extremely broad anteriorly, its greatly produced antero-external angle completing the orbit below and in front. The mobile portion of the antenna, which is freely exposed, varies in length and in the form of the flattened 2nd joint of the peduncle. In some males (var. *mascarenica*) the mobile portion of the antenna is half the length of the horizontal portion of the carapace, and the length of the 2nd joint is rather more than one-third the breadth of the rostrum at its own point of origin. But in all ovigerous females, and in certain males, the mobile portion of the antenna is between one-third and one-fourth the length of the hori-

zontal portion of the carapace, and the length of the 2nd joint is less than one-third the breadth of the rostrum at its own point of origin—the joint also being somewhat broadened.

The chelipeds also vary. In certain males, both adult and young (var. *mascarenica* partim), they are stouter than the other legs, are very variably granular, are a little longer than the carapace, have the hand very variably broadened and inflated, and the fingers closely apposable only at tip.

In all females they are a little shorter than the carapace, are quite smooth, are rather slenderer than the other legs, and have slender palms, and fingers that are closely apposable in the greater part of their extent.

In certain other adult males they are intermediate in condition, approaching more to the female type.

The ambulatory legs are moderately stout and are hairy: the 1st pair, which are the longest, are rather longer than the chelipeds; the others decrease gradually in length.

Miers' valuable paper, Ann. Mag. Nat. Hist., 1885, Vol. XV. pp. 6–8 should be consulted. After examining over forty specimens from the Andamans I adhere to Kossmann's synonymy and opinion (*loc. cit.*)

The characters upon which the separation of *M. mascarenica* from *M. philyla* is based are all variable; and I think that we have here to deal with a case of male dimorphism, such as is known to occur in certain Beetles, where one form of male is aberrant from the female type while another form of male resembles the female in certain particulars: *vide* Bateson and Brindley, Variation in Secondary Sexual Characters, P.Z.S., 1892, p. 585.

Micippa thalia, Herbst.

Cancer thalia, Herbst, Krabben, III. iii. 50, tab. lviii. fig. 3.

Micippa thalia, Gerstäcker, Archiv. fur Naturgesch., XXII. 1856, p. 109; and Adams and White, 'Samarang' Crust., p. 15; and A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 238, pl. xi. fig. 1; and Kossmann, Reise Roth. Meer., Crust., p. 8 (*et varr.*); and Miers, Zoology H. M. S. 'Alert,' pp. 182 & 198, and ANN. MAG. NAT. HIST., 1885, Vol. XV. p. 10 (*ubi synonym.*), and 'Challenger' Brachyura, p. 70; and [Cano., Boll. Soc. Nat., Napol., III. 1889, p. 179]; and Ortman, Zool. Jahrb. Syst., etc., VII. 1893, p. 60; and Henderson, Trans. Linn. Soc., Zool., 1893, p. 348.

Micippa thalia (= var. *aculeata*), de Haan, Faun. Japon. Crust., p. 98, pl. xxiii. fig. 3; and Krauss, Südafr. Crust., p. 51; and Bianconi, Mem. Ac., Bologna, III., 1851, p. 103, pl. x. fig. 2; and Kossmann, Reise Roth. Meer., Crust., pp. 5 and 8, pl. iii. fig. 5; and Hilgendorf, MB. Akad., Berl., 1878, p. 786; and Richters, Möbius, Meeresfauna, Maurit., p. 142; and Miers, Ann. Mag. Nat. Hist., 1885, Vol. XV. p. 11 (*ubi synonym.*); and De Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 20; and Mary J. Rathbun, Proc. U. S. Nat. Mus., Vol. XVI. 1893, p. 92.

Micippe miliaris, Gerstäcker, Archiv. fur Naturges., XXII. 1856, p. 110; and Heller, Crust. Roth. Meer., SB. Ak., Wien, XLIII. 1861, p. 298, pl. i. fig. 1; and Kossmann, Reise Roth. Meer., Crust., pp. 4 and 8; and Miers, Ann. Mag. Nat. Hist., 1885, Vol. XV., p. 11.

Micippa haanii, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 217; and Miers, Zool. H. M. S. 'Alert,' pp. 517 and 524; and C. W. S. Aurivillius, Kongl. Sv. Vet. Ak. Handl., XXIII. 1888-89, No. 4, p. 52, pl. iv. figs. 1, 1a; and de Man, J. L. S., Zool., Vol. XXII. 1888, p. 20.

Micippe pusilla, Bianconi, Mem. Ac. Sci., Bologna, 1869, Vol. IX. p. 205, pl. i. fig. 1: and Hilgendorf, MB. Ak., Berl., 1878, p. 787.

Micippa inermis, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 445, pl. xxvi. fig. 3, and Cat. Austral. Crust., p. 24.

Body and ambulatory legs covered with a woolly tomentum.

Carapace with the regions fairly well-defined, the hepatic regions depressed, and the surface closely and evenly granular. From the granular surface there usually, but not always, arise several large vertical spines, which are typically disposed as follows:—one on either supra-ocular hood, two on the gastric region in the middle line, and two placed obliquely on either branchial region. Any or all of these spines may be suppressed. The lateral margins are armed with an irregular series of spines or spinules, and a few spinules may exist on the posterior border in the middle line.

The rostrum is deflexed nearly vertically in the adult female, less vertically in the adult male, and at an angle of 45° or less in the young male: it ends in two curved divergent spines.

The basal antennal joint is produced at its antero-external angle to assist in the formation of the floor of the orbit, but there is a wide hiatus between this process and the post-ocular spine, so that the floor of the orbit is incomplete.

The chelipeds in the adult male are as long as the carapace, are not much stouter than the other legs, and have slender palms, and long slender fingers which, though nearly straight, are closely apposable only in their distal half. In the adult female the chelipeds are equal in length to the post-orbital portion of the carapace, are slenderer than the other legs, and have tapering palms and minute fingers. The merus and carpus of the ambulatory legs are sometimes swollen.

In the Museum collection are specimens, representing all the varieties of this species, from Mergui, Burma, Orissa and Malabar, as well as from Hongkong and Nagasaki.

This species shows quite as well as *M. cristata* the close relation of *Micippa* to *Maia*.

Micippa margaritifera, Henderson.

Micippa margaritifera, Henderson, Trans. Linn. Soc., Zool., 1893, p. 348, pl. xxxvi. figs. 5-7.

Carapace symmetrically sculptured, closely crisply and finely granular, and with the hepatic regions deeply excavate: there are three coarse spinules, disposed in a triangle base outwards, on either branchial region, and a denticle at the anterior boundary of the branchial region; and on the posterior margin are three smooth polished globules "exactly resembling pearls" inset.

The rostrum is long, vertically deflexed in both sexes, and incurved at the tip, which ends in two shallow lobes—the outer angle of each lobe being marked by a spinule.

The basal antennal joint has its antero-external portion greatly produced to complete the floor of the orbit.

The chelipeds in the male are a little longer than the carapace, and have the palms broadened and inflated, and the fingers closely apposable only at the tip. In the female the chelipeds are very much slenderer than the other legs, are only as long as the post-orbital portion of the carapace, and have the hand very slender and tapering. The ambulatory legs are remarkable for their large obtriangular foliaceous meropodites, which in the first pair are specially remarkable, as they are closely apposable to the front, to form, as in *Calappa*, a shield.

In the Museum collection are specimens from both sexes from the Andamans, from Ceylon (34 fms.), and from the Maldives (20-30 fms.).

Micippa margaritifera, var. *parca* nov. I distinguish, provisionally, as a variety, two ovigerous females from the Andamans, in which the middle "pearl" on the posterior border is replaced by a group of spinules, and in which the meropodites of the ambulatory legs are even more broadly foliaceous.

CYPHOCARCINUS, A. M.-Edw.

Cyphocarcinus, A. Milne-Edwards, Nouv. Archiv. du Mus., IV. 1868, p. 73; and Miers, Journ. Linn. Soc., Zool., XIV. 1879, p. 664.

Carapace elongate, subcylindrical, with the gastric region greatly elevated; *the anterior part of the gastric region, along with the front, being vertically deflexed.* The rostrum is formed of two little horns, each of which is sharply bifurcate at the tip, one branch being directed forwards and outwards, the other being recurved upwards. The eyes are small and are sunk in small tubular orbits formed in the typical Periceroid manner. The antennæ are small: the basal joint has its antero external angle separated from the rest of the joint by a deep cleft. The external

maxillipeds have the merus dilated at both the internal and external anterior angles. The chelipeds in the female are not longer than the 2nd pair of legs and are hardly stouter. The ambulatory legs have the dactylus recurved, strongly spinate along the posterior edge—prehensile. The sternum in the female forms a hollow, the mouth of which is completely closed by the broad and perfectly flat abdomen.

? *Cyphocarcinus minutus*, A. M.-Edw.

Cyphocarcinus minutus, A. Milne-Edwards, *loc. cit.* pl. xix. figs. 7-12.

Carapace elongate, subcylindrical, the lateral borders nearly parallel in their posterior two-thirds, gently convergent anteriorly. Besides the greatly elevated and anteriorly deflexed gastric region, there are two or three slight bulgings on the side of either branchial region, a slight elevation on the cardiac region, and a median prolongation—overlapping the abdomen—of the posterior border. The hepatic regions are very small and are not visible from the dorsal aspect. The supra-orbital border bears one or two little teeth. The second joint of the antennal peduncle is much enlarged, the third is clavate, and the flagellum is hardly to be distinguished from the hairs on the third joint. The chelipeds in the female are smooth, but the legs are hairy and have the joints, especially the merus, somewhat broadened. Two adult females, one from the Pedro Shoal, the other from the Andamans, are in the Museum collection. The larger of the two is 10 millim. long and has the carapace deeply encrusted by a colony of calcareous Polyzoa.

MACROCELOMA, Miers.

Macroceloma, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 665; and 'Challenger' Brachyura, p. 79.

Entomonyx, Miers, Zoology H. M. S. 'Alert,' p. 525.

Carapace subpyriform, but broadened anteriorly by the projecting orbits: the dorsal surface unarmed, or tuberculated, or with a few long spines: the margins without a series of elongated lateral spines, but often with a strongly developed lateral epibranchial spine, preceded by some smaller spines. The spines of the rostrum are well developed. The eyes are retractile within roomy projecting tubular orbits, which are formed much as in *Micippa*.

The antennæ have the basal joint considerably enlarged and armed distally with one or two spines. The mobile portion of the antenna is sometimes concealed by the rostrum, sometimes exposed. The merus of the external maxillipeds is broader than the ischium, and notched at the internal angle for the insertion of the palp.

The chelipeds in the male have the palms enlarged, and the fingers either arched and meeting only at the tip, or not. The ambulatory legs are rather short.

This genus might, without any unnatural stretch, be included with *Micippoides*, A. M.-Edw. (Journ. Mus. Godeffr. I., Crust., p. 254).

Macrocoeloma nummifer, n. sp., Plate IV. fig. 4.

Closely allied to *Macrocoeloma concava*, Miers, 'Challenger' Brachyura, p. 81, pl. x. fig. 2; and to *Entomonyx spinosus*, Miers, Zoology H. M. S. 'Alert,' p. 526, pl. xlvii. fig. B.

Carapace rather more than $\frac{1}{4}$ longer than broad, with the regions well-defined: its surface is regularly and sharply tubercular and is armed with two sharp spines—one behind the other—on the gastric region, two larger—side by side—on the cardiac region, two still larger—one obliquely behind the other—on the lateral epibranchial region, and two very small ones—one behind the other—on the intestinal region.

The rostrum consists of two straight sharp slightly diverging spines, which are about one-fifth or one-sixth the length of the carapace proper, and which in the male are slightly deflexed, but in the female are strongly deflexed.

The basal joint of the antennæ is broadly obtriangular; its antero-external angle is produced to aid in forming the floor of the orbit—this orbital process having its free margin deeply excised; its antero-internal angle carries a stout vertically directed tooth. The orbits, which are in the form of large deep projecting tubes with jagged lips, are constituted as in *Micippa*.

The chelipeds are closely and sharply granular as far as the fingers: in the male they are much stouter than the other legs, are nearly as long as the carapace and rostrum, and have large broad palms, and strongly arched fingers that meet only at the tip. In the female the chelipeds, although not much shorter than those of the male, are hardly stouter than the other legs, and have fingers that can be closely apposed throughout their extent.

The ambulatory legs are slender: in all the meropodite has its posterior margin minutely spinulose, and has a spine on the far end of the upper margin: the first pair, which are the longest, are a little longer than the chelipeds.

The rostrum carapace and legs are beset with stiff curly hairs.

The abdomen in both sexes consists of seven distinct segments.

This species commonly encrusts itself with a plate armour of Orbitolites, rounded fragments of Nullipore, &c.

Loc. Andaman Sea, 17-36 fms. Off Ceylon 34 fms.

		Male.	Adult female.
Greatest length	...	21 millim.	21 millim.
„ breadth	...	14 „	16 „
Length of chelipeds	...	19 „	15 „

TIARINIA, Dana.

Tiarinia, Dana, U. S. Expl. Exp., Crust., pt. I. p. 109.

Tiarinia, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 664.

Carapace subpyriform, somewhat broadened anteriorly, tuberculated, terminating in a rostrum composed of two moderately deflexed horns which are in close contact with one another, except sometimes at the extreme tip.

The eyes are enclosed in tubular orbits formed by a prominent supra-ocular roof the anterior angle of which is strongly produced forwards, by a cupped post-ocular tooth, and by a process of the broad basal antennal joint, all three elements being in the closest contact. The mobile portion of the antenna is completely exposed.

The external maxillipeds have the merus broader than the ischium owing to the expansion of its external angle, and the palp inserted in a slight notch in the internal angle of the merus.

The chelipeds are little enlarged in the male: the ambulatory legs have the dactylus short and claw-like.

The abdomen in both sexes consists of seven distinct segments.

Tiarinia cornigera, (Latr., Edw.)

[*Pisa cornigera*, Latr., Encyc., X. 141.]

Pericera cornigera, Milne-Edwards, Hist. Nat. Crust., I. 335; and Adams and White, 'Samarang' Crust., p. 18.

Tiarinia cornigera, Dana, U. S. Expl. Exped., Crust., pt. I. p. 110, pl. iii. figs. 5a-e; and Stimpson, Proc. Acad. Nat. Sci., Philad., 1857, p. 217; and Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 449, and Cat. Austral. Crust., p. 28; and Miers, Ann. Mag. Nat. Hist., 1880, Vol. V. p. 228; and Mary J. Rathbun, Proc. U. S. Nat. Mus., Vol. XV. 1892, pp. 243 and 276.

? *Pericera tiarata* and *setigera*, Adams and White, 'Samarang' Crust., p. 17.

— *Tiarinia verrucosa*, Heller, 'Novara' Crust., p. 4, taf. i. fig. 3.

Tiarinia mammillata, Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 448, and Cat. Austral. Crust., p. 27.

Body and ambulatory legs with many curly hairs.

Carapace pyriform, the regions well-defined, the surface closely and very variedly pustular nodular and granular, but with the following markings fairly constant:—two parallel longitudinal lines of small nodules between the orbits; a "cross" of larger nodules on the gastric

region, the base of the cross being formed by three pustules; three pustules arranged in a triangle base forwards on the cardiac region, behind which are three conical tubercles arranged in a transverse line; a coarse claw-like tooth at the lateral epibranchial angle.

The rostrum consists of two moderately deflexed spines, which are parallel, and in the closest contact, either throughout their extent, or to near the tips, which may then be upcurved and slightly divergent: the length of the rostrum varies from nearly one-half to one-fourth the length of the carapace, its usual length is about $\frac{2}{7}$ ths that of the carapace.

The antennæ have the basal joint broadened and produced to form the floor of the orbit, the antero-external angle being further produced to form a coarse spine: the next two joints are broadened and fringed with stiff bristles: the flagellum is short. The eyes are ensheathed in orbits which are formed as already described: the supra-ocular eave has a dog's-ear form, and the post-ocular tooth is also salient. The chelipeds in the adult male are as long as the carapace without the rostral spines, and are a little stouter than the other legs: the merus is nodular, most markedly so on the upper surface; the carpus is granular; and the palm—which is a good deal broadened and inflated—and the fingers, are smooth and polished, the fingers being arched and meeting only at tip.

In the female and young male the chelipeds are only as long as the post-orbital portion of the carapace, are slenderer than the other legs, and have the palm slender, the fingers however being arched.

The ambulatory legs are stout, and have strong claw-like dactyli, the posterior border of which is denticulate; the ischium in all is swollen, and is more or less nodular on the upper surface; and the carpus in all is broadened: the first pair, which are considerably the longest, slightly exceed the length of the carapace and rostrum.

In the Museum collection are forty well preserved specimens from the Andamans.

The closeness of the relation between *Tiarinia* and *Micippa* is well seen in the very young of the above species, in which the carapace is depressed and is so broad in front as to be almost oblong, and the rostrum is deflexed at an angle of 45° .

Family II. PARTHENOPIDÆ.

Parthenopiens (part.) and *Canceriens cryptopodes*, Milne-Edwards, Hist. Nat., Crust., I. pp. 347 and 368.

Parthenopinea, Dana, U. S. Expl. Exp., Crust., I. pp. 77 and 136.

Parthenopinea, Miers, Journ. Linn. Soc., Zool., Vol. XIV. p. 641; and 'Challenger' Brachyura, p. 91.

The eyes are usually retractile within small circular well-defined orbits, the floor of which is nearly continued to the front, leaving a hiatus which is usually filled by the second joint of the antennary peduncle. The basal antennal joint is small, and is deeply imbedded between the inner angle of the orbit and the antennular fossæ.

The antennules fold a little obliquely.

The *Parthenopidæ* are divided by Miers into two sub-families, namely:—

Sub-family I. *Parthenopinæ*; in which the carapace is sometimes sub-pentagonal or ovate-pentagonal, more commonly equilaterally-triangular, and sometimes almost semi-circular or semi-elliptical in outline; in which the cardiac and gastric regions are usually so deeply marked off from the branchial regions on either side as to make the dorsal surface of the carapace trilobed; in which the chelipeds are vastly longer and more massive than the ambulatory legs; and in which the rostrum is either simple or obscurely trilobed.

Sub-family II. *Eumedoninæ*; in which the carapace is, commonly, sharply pentagonal, with the junction of the antero-lateral and postero-lateral borders strongly produced; in which the cardiac and gastric regions are not conspicuously marked off from the branchial regions; and in which the chelipeds are of moderate size.

Sub-family I. PARTHENOPINÆ, Miers.

Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 668.

Key to the Indian genera.

I. Carapace not laterally expanded:—

1. Basal antennal joint very short, not nearly reaching the inner canthus of the orbit: fingers of chelipeds very strongly incurved... LAMBRUS.
2. Basal antennal joint nearly reaching the inner canthus of the orbit: fingers slightly incurved PARTHENOPE.

II. Carapace more or less expanded to form a vault in which the ambulatory legs are concealed:—

1. Carapace transversely triangular; greatly expanded both laterally and posteriorly CRYPTOPODIA.
2. Carapace transversely triangular; expanded laterally, but not posteriorly: a ridge on the pterygostomial region..... HETEROCRYPTA.

3. Carapace transversely oval; expanded laterally,
but not posteriorly: no ridge on the ptery-
gostomial region..... CETHRA.

LAMBRUS, Leach.

Lambrus, Leach, Trans. Linn. Soc., Vol. XI. 1815, pp. 308, 310.

Lambrus, Milne-Edwards, Hist. Nat. Crust., I. 352.

Lambrus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 146.

Lambrus, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 668; and 'Challenger' Brachy-
ura, p. 91.

Carapace either broadly triangular with rounded sides and pointed front, or ovate-pentagonal with front pointed but extremely short: the surface is granular, or tubercular, or spiny.

The eyes are enclosed in distinct orbits, which have a suture above and a hiatus below, the hiatus being occupied by the second joint (true third joint) of the antennal peduncle.

The antennules fold obliquely. The antennæ are small: their basal joint, which is extremely short, and does not reach the front, is wedged in between the antennular fossa and the large lobe that constitutes the floor of the orbit.

The buccal frame is usually quadrangular, but is sometimes a little narrowed in front; it is completely closed by the external maxillipeds: the epistome is sometimes very large, sometimes narrow.

The chelipeds are usually of immense size and length, out of all proportion to the short slender ambulatory legs: the meropodite and "hand" are usually prismatic, with the borders strongly dentate: the fingers are much shorter than the palm, and are abruptly curved inwards and a little downwards.

The abdomen of the female usually consists of seven segments; that of the male of five or six.

Professor A. Milne-Edwards, (Miss. Sci. Mex., Crust., I. pp. 146-148) subdivides the genus *Lambrus* into ten sub-genera, the independence of all of which, however, is not universally admitted.

The sub-genera at present known to exist in Indian waters are shown in the following

Key to the Indian sub-genera of the genus Lambrus.

- I. Carapace tuberculate, ovate-pentagonal, the rostrum not
breaking beyond the general outline of the body: the
buccal frame a little narrowed in front..... LAMBRUS.

- II. Carapace strongly carinated or tuberculated, broadly triangular (considerably broader than long), with rounded sides and a broad but sharp-pointed projecting rostrum: no post-ocular constriction: chelipeds with the arm and hand straight, sharply trigonal, the edges of these joints, as also the outer edge of the carpus, being very sharply and stoutly serrated..... PLATYLAMBRUS.
- III. Carapace granular or spiny, usually as long as broad, with a projecting rostrum, and a very distinct post-ocular constriction..... RHINOLAMBRUS.
- IV. Carapace granular, broader than long, and with the postero-lateral angle produced to form a great blade-like spine. Pterygostomian region deeply channelled, obliquely, the channel being closed below by thick fringes of hairs.... AULACOLAMBRUS.
- V. Carapace worn and eroded, broader than long, almost semi-circular in outline, with the postero-lateral angle produced; the rostrum more or less deflexed, and not, or hardly, breaking the general outline: no post-ocular, but a fairly distinct post-hepatic constriction: chelipeds with the arm and hand indefinitely contorted, not sharply trigonal; and with their edges, if spinate, irregularly and bluntly so; the carpus quite smooth externally: the chelipeds are short for the genus..... PARTHENOLAMBRUS.

Sub-genus LAMBRUS, A. Milne-Edwards.

Lambrus, A. Milne-Edwards, Miss. Sci. Mex. Crust., I. p. 146.

Lambrus, Miers, 'Challenger' Brachyura, p. 92, (part.)

Carapace ovate-pentagonal, with the surface granular or pustular and but little carinate in the adult: rostrum exceedingly short.

Lambrus longimanus, Leach.

? *Cancer spinosus longimanus*, Rumph, Amboin. Rariteitk., pl.-viii. fig. 2.

Cancer macrochelous, Seba, III. xix. 1, 8, 9.

? *Parthenope longimanus*, Fabr. Suppl., p. 353.

? *Cancer longimanus*, Linn., Syst. Nat., II. 1046, 42.

? *Cancer longimanus*, Herbst, Krabben, I. ii, 253, taf. xix. figs. 105, 107.

Lambrus longimanus, Leach, Trans. Linn. Soc., Vol. XI. 1815, p. 310; and Milne-Edwards, Hist. Nat. Crust., I. 354; and Cuvier, Regne Animal, pl. xxvi. fig. 1; (and ? *Lambrus longimanus*, Adams and White, 'Samarang' Crust., p. 30); and Bleeker, Crust. de l'Ind. Archip., p. 17 (nec syn. pelagicus, Rupp.); and Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 20, and Zoology H. M. S. 'Alert,' pp. 182 and 200, and 'Challenger' Brachyura, p. 95; and W. A. Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 449, and Cat. Austral. Crust., p. 31; and A. O. Walker, J. L. S., Zool., Vol. XX. 1890, p. 109; and de Man, J. L. S., Zool., Vol. XXII. 1888, p. 21 (ubi synon.); and Henderson, Tr. Linn. Soc., Zool., (2) V. 1893, p. 349.

Carapace almost oval transversely, and with the surface granular or pustular. (In the young, besides tubercles, there are some coarse spinules in five series—a median, and two oblique lateral on either side.) The lateral borders are spinulate or crenulate anteriorly, spinate posteriorly, smooth quite posteriorly at the junction with the posterior border: the posterior border, except for a hook-like spinule at either end, and two spinules in the middle line, is smooth: there are often one or two curved spines on the branchial region: the pterygostomian region is quite smooth, but on the inferior branchial region are a few coarse spinules, most distinct at the bases of the legs.

The rostrum, which is symmetrically trilobed, is very small, its length being less than one-twelfth that of the rest of the carapace.

The chelipeds, which are massive, are about four times the length of the carapace in the male, about $3\frac{1}{2}$ times in the female: the *meropodite* is prismatic, or, in transverse section, rhomboidal; its anterior and posterior edges are armed with numerous, somewhat curved, spines—alternating larger and smaller; its upper edge, as sometimes either upper surface, has a row of spinules; its lower edge is rounded, and has a discontinuous series of spinules; its under surfaces are smooth and polished: the *carpus* has 3 or 4 sharp thin teeth on its outer margin: the trigonal *palm* has twelve or more sharp thin lacinated teeth on its outer edge—alternately larger and smaller; along its inner edge is a long series of multicuspid spines; its under edge is finely beaded, and its under surfaces are almost smooth; its upper surface has numerous irregularly disposed spinules and granules: the *dactylus* has numerous spinules on the outer surface of its broad base.

The ambulatory legs have the merus compressed and spinulate as to its edges, especially the posterior (inferior) edge: the longest of the ambulatory legs is hardly longer than the meropodite of the chelipeds.

Colours in life, pale lilac dorsally, white ventrally.

In the Museum collection are numerous specimens from the Madras coast, from Arrakan and Mergui, and from the Andamans.

Sub-genus *PLATYLAMBRUS*, Stimpson.

Platylambrus and *Enoplolambrus*, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. pp. 146 and 147.

Lambrus, Miers, 'Challenger' Brachyura, p. 92 (*part*).

Carapace carinated or tuberculated, broader than long, broadly triangular with rounded sides and a broad but acute and projecting rostrum: no post-ocular constriction: chelipeds with the meropodite ~~dan~~ palm straight, the former joint prismatic, the latter sharply tri-

gonal, the anterior and posterior borders of both joints sharply laciniate or serrate, as is also the outer edge of the carpus.

Key to the Indian species of the sub-genus *Platylambrus*.

- | | |
|---|--|
| <p>I. Carapace with three distinct carinae, one median, and one, oblique, on either side: chelipeds with their surfaces (but not their edges) for the most part smooth: ambulatory legs, with few spines.</p> | <p>1. Infra-orbital lobe entire and strongly produced at the inner (inferior) angle to form a great spin: plainly visible from above on either side of the rostrum <i>L. prensor</i>.</p> <p>2. Infra-orbital lobe deeply cleft, the inner portion not or hardly visible from above <i>L. carinatus</i>, Edw.</p> |
|---|--|
- II. Carapace covered with great mushroom-like or papilliform tubercles: chelipeds with their surfaces very strongly spinate or tuberculate: ambulatory legs strongly spiniferous..... *L. echinatus*.

Lambrus (*Platylambrus*) *prensor*, Herbst.

Lambrus prensor, Herbst, Krabben, II. ii. 170, tab. xli. fig. 3.

Lambrus prensor, Milne-Edwards, Hist. Nat. Crust., I. 358.

Lambrus jourdainii, F. de B. Capello, Journ. Sci. Lisbon, III. 1870-71, tab. 3, fig. 6.

Lambrus prensor, A. Milne-Edwards, Nouv. Archiv. du Mus., Vol. VIII. 1872, p. 260 (foot-note); and Miss. Sci. Mex., Crust., I. p. 147 (foot-note).

Lambrus prensor, Walker, J. L. S. Zool., Vol. XX. 1890, p. 109 (name only).

Our numerous specimens correspond exactly with Capello's figure and succinct and graphic description. M. A. Milne-Edwards at first assigned Capello's species to *L. carinatus*, Edw., but afterwards to *L. prensor*, and it is this last authority that I now follow.

Carapace broader than long, broadly triangular with the sides rounded: the median and branchial regions are strongly prominent, the former having three small spinules in the middle line, the latter having each two oblique granular ridges, one of which is very faint and runs to the large lateral epibranchial spine, the other of which forms a strong carina, and runs to the large spine at the postero-lateral angle. The antero-lateral margin is armed with 7 or 8 nearly equal-sized close-set compressed teeth, behind which, at the lateral epibranchial angle, is a very large blade-like spine: behind this again, on the postero-lateral border are two large teeth, the outer of which, at the postero-lateral angle, is nearly as large as the lateral epibranchial spine; and lastly on the posterior border are three large curved spines.

The rostrum is acute, concave at base, and slightly recurved at tip: on either side of the rostrum is seen from above a very strong and acute spine formed by the prolongation of the inner margin of the infra-orbital lobe—this lobe is entire.

The chelipeds are massive and are about three times the greatest length of the carapace: their surfaces are almost smooth: the arm is rhomboidal in transverse section, and the palm is sharply trigonal: the lower edges of the arm, wrist and palm form a continuous line of beading: the upper edge of the arm is granular and spinular: the inner or anterior edges of the arm, wrist and hand are spinate—the spines growing larger towards the end of the palm, while the posterior (or outer) edges of the same three joints are very strongly and closely lacinate.

As usual the spines in all cases have a tendency to be alternately larger and smaller.

Of the ambulatory legs the merus, carpus and propodus have the anterior (upper) border strongly and sharply carinate, while the merus has also the posterior border spinate.

This species is not uncommon along the Orissa coast, from 8 to 23 fathoms.

Lambrus (Platylambrus) carinatus, Edw.

Lambrus carinatus, Milne-Edwards, Hist. Nat. Crust., I. 358.

Lambrus carinatus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 147 (foot-note).

Our specimens, which agree with the diagnoses of M. A. Milne-Edwards completely, are distinguished from those above described as *L. prensor*, (1) by having the mid-dorsal carina formed by three great compressed teeth; (2) by the single, and very high and sharply cut carina on either branchial region; (3) by the smaller size of the spine at the lateral epibranchial angle and of the spine, at the postero-lateral angle, immediately succeeding it; (4) by the form of the infra-orbital lobe, which instead of being entire, is bilobed—the inner lobe, moreover, having a rounded apex, and not being visible from above; (5) by the meropodites of the ambulatory legs having their anterior (upper) edge serrate, not carinate, and by the carpopodites and propodites having the anterior edge smooth.

These differences are constant in a series of twelve specimens, including both sexes.

This species also differs from *L. prensor* in its much smaller size, three ovigerous females having the carapace 11 millim. in its greatest breadth (exclusive of spines), while ovigerous females of *L. prensor* have the carapace 28 to 30 millim. in its greatest breadth exclusive of spines.

[? *Lambrus* (*Platylambrus*) *holdsworthii*, Miers.

Lambrus holdsworthii, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 19, pl. v. fig. 8; and 'Challenger' Brachyura, p. 93 and Henderson, Trans. Linn. Soc., (2) V. 1893, p. 350.

The single specimen that I doubtfully refer, from Miers' figure and description, to this species, has a close resemblance to both the species identified above as *L. prensor* and *L. carinatus*. It differs from them both (1) in having numerous scattered tubercles on the carapace, and (2) in having the large spine at the lateral epibranchial angle and the two outer spines on the postero-lateral margin all of about the same size. It resembles *L. prensor*, and differs from *L. carinatus*, in not having the branchial region traversed by a single sharp-cut carina: and it resembles *L. carinatus*, and differs from *L. prensor*, in having a median line (though not a high carina) of three large teeth, in having the infra-orbital lobe deeply cleft and not exceedingly produced, and in having the anterior (or upper) edge of the meropodites of the ambulatory legs dentate instead of carinate.]

Lambrus (*Platylambrus*) *echinatus*, Herbst.

Cancer echinatus, Herbst, Krabben, I. ii. 255, taf. xix. figs. 108-109.

Parthenope giraffa, Fabr., Supplement, p. 353.

[*Maia echinatus* and *giraffa*, Bosc, I. 250].

Lambrus giraffa, Desmarest, Consid. Crust., p. 85.

Lambrus echinatus, Milne-Edwards, Hist. Nat. Crust., I. 356.

Lambrus echinatus, Miers, 'Challenger' Brachyura, p. 93.

Carapace broader than long, broadly triangular with the sides rounded: the gastric and cardiac regions are elevated, and are delimited on either side from the elevated branchial regions by broad and deep grooves. The entire carapace is covered, but not very densely, with large mushroom-like and paxilliform tubercles, the spaces between which are occupied, but not densely, by short, crisp, upstanding hairs. The lateral margins are armed with ramose spines, which increase in size from before backwards: the posterior and part of the postero-lateral margins are armed with tubercles like those on the surface of the carapace. The granular rostrum is broad and concave at the base, and is then suddenly narrowed to form a little peak.

The chelipeds which are from $3\frac{1}{2}$ (female) to $3\frac{3}{4}$ (male) the greatest length of the carapace, are distinguished by having their upper aspect (edges and surfaces) covered with ramose spines, and their under aspect covered with great pearly tubercles. The ambulatory legs are distin-

guished by the large and numerous spines on their 3rd, 4th and 5th joints.

This species is not uncommon off the Orissa coast from 7 to 23 fathoms.

Sub-genus RHINOLAMBRUS, A. Milne-Edwards.

Rhinolambrus, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 148.

Lambrus, Miers, 'Challenger' Brachyura, p. 92 (part.).

Carapace triangular, usually as long as broad, with a broad projecting somewhat declivous rostrum and a very distinct post-ocular constriction; surface of carapace very commonly, but not always, spiny and granular.

Key to the Indian species of the sub-genus *Rhinolambrus*.

- | | | |
|---|---|---|
| I. Chelipeds stout, three times to twice or less the length of the carapace and rostrum. | {
1. Carapace and chelipeds very closely covered with large rugged granules and sharp ramose spines.
2. Carapace with few depressed tubercles, or nearly smooth: chelipeds with blunt teeth or smooth granules. | {
i. Chelipeds nearly three times the length of the carapace and rostrum..... <i>L. contrarius</i> .
ii. Chelipeds not two-and-a-half times the length of the carapace and rostrum..... <i>L. longispinis</i> .
{
i. Chelipeds three times the length of the carapace and rostrum..... <i>L. pelagicus</i> .
ii. Chelipeds not twice the length of the carapace and rostrum <i>L. gracilis</i> . |
| II. Chelipeds slender, three-and-a-half to five times the length of the carapace and rostrum. | {
1. Carapace at least as long as broad: large erect turret-like spines on the carapace.
2. Carapace broader than long; large spines of ordinary form on the carapace | {
i. A single turret on the cardiac region, and on either branchial region: two large diverging spines in the middle line on the posterior border... <i>L. turriger</i> .
ii. Two turrets on the cardiac region, and two on either branchial region: a single spinule on the posterior margin..... <i>L. cybelis</i> .
<i>L. petalophorus</i> . |

Lambrus (Rhinolambrus) contrarius, Herbst.

- Cancer contrarius*, Herbst, Krabben, III. iv. 18, tab. lx. fig. 3.
 [Parthenope spinimana, Lamk., Hist. Anim. Sans. Vert., V. 239.]
Lambrus spinimanus, Desmarest, Consid. Crust., p. 86, pl. iii. fig. 1.
Lambrus contrarius, Milne-Edwards, Hist. Nat. Crust., I. 354.
Lambrus contrarius, Bleeker, Recherches Crust. de l'Ind. Archip., p. 18.
Lambrus contrarius, A. Milne-Edwards, Maillard's l'ile Réunion, Annexe F, p. 10.
Lambrus contrarius, Brocchi, Ann. Sci. Nat., (6) II. 1875, Art. 2, p. 98, pl. xviii. figs. 166, 167 (♂ appendages).
Lambrus contrarius, Richters, in Möbius, Meeresf. Maurit., p. 145.
Lambrus contrarius, Miers, Ann. Mag. Nat. Hist., 1880, Vol. V. p. 230; and 'Challenger' Brachyura, p. 94.
Lambrus contrarius, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 350.

Carapace, with rostrum, slightly longer than broad, everywhere covered with jagged granules and spines: the regions are strongly convex, and, usually, in the middle line, are three or four, and again on either branchial region, one or two spines of predominant size. The rostrum is broad, prominent, declivous, and spiny or granular, both on the upper surface and along the margins. The hepatic regions are very prominent, and their angle is strongly produced. The orbital edge is prominent and the post-orbital constriction strongly pronounced.

The chelipeds are about three times the length of the carapace and rostrum, and are extremely massive, the hands especially: above they are covered with large sharp jagged spines with rough tubercles interspersed; below they are everywhere covered with rasp-like granules. The ambulatory legs are rather stout for a *Lambrus*, and have the merus somewhat spiny along one or both edges.

Colours in spirit, mottled pink, tips of fingers purple-black, ambulatory legs banded alternately yellow and bluish pink.

Our largest specimens, a male and a female, are from off Colombo, 26½ fathoms, and have a span (of chelipeds) of 290 millim. and 265 millim. respectively.

Lambrus (Rhinolambrus) longispinus, Miers.

- Lambrus longispinus*, Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 18; Zoölogy H. M. S. 'Alert,' pp. 182 and 199; and 'Challenger' Brachyura, p. 93.
Lambrus longispinus, de Man, Archiv. fur Naturgesch., LIII. 1887, p. 229.
Lambrus longispinus, Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109.
Lambrus longispinus, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 350.
Lambrus spinifer, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 451, pl. xxvii. fig. 1; and Cat. Aust. Crust., p. 34.

Carapace, with rostrum, little longer than broad, its surface covered with spiny tubercles: There are four prominent spines in the middle

line, of which three are on the cardiac and one is on the gastric region; in front of the latter are two smaller spines placed transversely: on the branchial regions are some small spines set in two oblique series, and one large spine. On the antero-lateral margins are about nine small close-set blunt faintly-lacinated teeth, slightly increasing in size posteriorly; on the postero-lateral margin are two large spines; and on the posterior border, in the middle line, is a pair of spines. The rostrum is broad, prominent, acute and declivous. The post-ocular constriction is distinct; and the hepatic regions are well marked, with the outer border denticulate. The chelipeds in the male are about $2\frac{1}{3}$ times the length of the carapace and rostrum: they much resemble those of *L. contrarius*, the spines being for the most part jagged, and the tubercles rasp-like. On the anterior (inner) margin of the arm are 10 or 12 spines alternating in size, the last three being very small; on the upper surface of the arm three spines are very prominent, as are three or four on the posterior (outer) edge. On the anterior (inner) margin of the hand are 7 or 8 spines increasing in size from behind forwards; while on the posterior margin are numerous spines—only three or four of which are large. The lower surface of the arms, wrists and hands is closely covered with large round rasp-like tubercles. The merus and sometimes the two following joints of the ambulatory legs, have the margins dentate.

Our single specimen from the Arrakan coast, 13 fms., is plainly the same as Haswell's *L. spinifer*, judging from his figure (*tom. cit.*) Both from that figure and from our specimen I should consider the species to be more nearly related to *L. contrarius* than to *L. validus*.

Lambrus (Rhinolambrus) pelagicus, Rüpp.

Lambrus pelagicus, Rüppell, Beschr. u. Abbild. 24 Art. Krabben des Roth. Meer., p. 15, pl. iv. fig. 1.

Lambrus pelagicus, Milne-Edwards, Hist. Nat. Crust., I. 355.

Lambrus pelagicus, Rüpp. (prob. = *affinis*, A. M.-Edw.) Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 21.

Lambrus pelagicus, Ortmann, Zool. Forsch. in Austral. u. Malay. Archip., Jena, 1894, p. 46.

Lambrus affinis, A. M.-Edw., Nouv. Archiv. du Mus., VIII. 1872, p. 261, pl. xiv. fig. 4.

Lambrus affinis, Haswell, Cat. Austral. Crust., p. 34.

Lambrus affinis, Miers, 'Challenger' Brachyura, p. 95.

Lambrus affinis, J. R. Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 350.

[*Lambrus affinis*, F. Müller, Verh. Ges. Basel, VIII. p. 473.]

[*Lambrus affinis*, Cano, Boll. Soc. Nat. Napol., III. 1889, p. 187.]

Carapace, with rostrum, as long as broad: its regions well delimited and faintly pitted and pimpled, the furrows between the regions

being smooth and bare—except for a pimple at each of the four angles of the cardiac region. On either branchial region, above the postero-lateral angle of the carapace, is a bluntly conical spine. The rostrum is very broad, and is concave and bluntly pointed: on either side above the eye is a little eminence which carries a tuft of long silky hairs. The post-ocular constriction is distinct, as is also the post-hepatic. The antero-lateral (including the hepatic) margin is faintly crenulated: the posterior border is quite smooth.

The chelipeds in the male are three times the length of the carapace, but not more than $2\frac{1}{2}$ times in the female: the anterior (or inner) margin of the arm and hand is evenly and bluntly dentate, or crenulate; the posterior (or outer) margin in the same joints is as evenly but much more bluntly and indistinctly dentate, and the lower margin faintly beaded: the carpus is either quite smooth or has a few nodules.

The ambulatory legs are smooth, rather stout, and are longer than the hand. In the male near the anterior border of the 6th abdominal tergum is a strong spine. This is a fairly common species at the Andamans.

Lambrus (Rhinolambrus) gracilis, Dana.

Lambrus gracilis, Dana U. S. Expl. Exp. Crust., pt. I. p. 137, pl. vi. figs. 6 a-b.

Lambrus gracilis, Miers, 'Challenger' Brachyura, p. 94.

Lambrus deflexifrons, Alcock and Anderson (*nec* Miers), J. A. S. B., 1894, pt. ii. p. 199.

Carapace, with rostrum, considerably longer than broad; with a pronounced post-ocular constriction; somewhat rhomboidal in shape: the regions are extremely prominent, especially the cardiac, which is capped by a conical tooth, and the branchial, which rises into an oblique crest terminating posteriorly in a tooth: the hepatic region forms a prominent tooth, behind which the rounded lateral margins are 6 or 7 toothed: there are two laminar teeth on the posterior border: otherwise the carapace is smooth. The rostrum is broad, deflexed, and distinctly trilobed towards the tip.

The chelipeds are not quite twice the length of the carapace and rostrum; and in the adult are not symmetrical—one, either right or left, having the hand much larger than the other. In the young the asymmetry is hardly noticeable. The arm has the anterior (inner) and posterior (outer) border irregularly armed with compressed blunt spines, of which the one at the far end of the outer border is the largest—being almost foliaceous: the hand has its inner and outer borders armed in the same irregular way, two or three of the teeth on the outer border, and one on the inner border being enlarged: the under surfaces

of the chelipeds are quite smooth, but the upper surface of the arm has an incomplete longitudinal line of beading. The ambulatory legs are long and particularly slender.

In the Museum collection are specimens of males, ovigerous females and young, from the Andamans and from off Ceylon.

Lambrus (Rhinolambrus) deflexifrons, Miers.

Lambrus deflexifrons, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 21, pl. v. fig. 5. Ceylon.

This species, which is not represented in the Museum collection, is described as follows by Miers:—

“The carapace is strongly constricted behind the orbits, with the cardiac region very convex, and with an oblique but shallow sulcus on the branchial regions, and is covered with closely-set small tubercles; the antero-lateral margins are unarmed; but there are two larger tubercles or small spines on the postero-lateral margins. The rostrum is vertically deflexed, triangular, and granulated above. The basal antennal joint is very small; the epistoma is large; the sub-hepatic and pterygostomian regions are not channelled. The anterior legs have the arm rounded and tuberculate above, with small spines on its anterior margin; the wrist is tuberculate; the hand with a few tubercles on its upper surface, the anterior margin armed with about ten, and the posterior with four granulated spines. The under surface of arm, wrist, and hand is closely granulated. The ambulatory legs are smooth, and are not compressed and cristate as usual in the genus.

The vertically deflexed rostrum and carapace, devoid of spines on its surface and anterior margins, and non-compressed ambulatory legs are characteristic of this species. It seems to be allied to *L. gracilis*, Dana, a species from the Fijis, in the form of the carapace and legs; but in that species the carapace has a spine on the cardiac and each branchial region, and elsewhere appears to be smooth.”

Lambrus (Rhinolambrus) turriger, Ad. & Wh.

Lambrus turriger, White, P. Z. S., 1847, p. 58; Ann. Mag. Nat. Hist., Vol. XX. 1847, p. 63; and Adams and White, ‘Samarang’ Crust., p. 26, pl. v., fig. 2.

Lambrus turriger, W. A. Haswell, Proc. Linn. Soc., N. S. Wales, Vol. IV. 1879, p. 449; and Cat. Austral. Crust., p. 32.

LAMBRUS TURRIGER, MIERS, ZOOLOGY H. M. S. ‘ALERT,’ p. 201; and ‘Challenger’ Brachyura, p. 96.

Carapace, with rostrum, a little broader than long; slightly granular; the regions well-defined and armed with huge, erect or semi-erect, knob-headed spines, as follows:—one on the gastric region, in the mid-
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dle line, one on the cardiac region in the middle line, and one on each branchial region: there is sometimes a little spinule in front of the gastric spine, and one in front of either branchial spine; and on the posterior border, in the middle line, are two divergent spines directed backwards. The rostrum is broad, concave between the eyes, somewhat deflexed, and may be described as trilobed near the tip—since it is there suddenly truncated and continued in the middle line only.

There is a distinct post-ocular constriction, and the hepatic regions are well-defined laterally.

The chelipeds are long slender and rugose: the arm is cylindrical, and the palm subcylindrical, becoming enlarged and trigonal near the fingers: in the male the chelipeds are from $4\frac{1}{2}$ to $5\frac{1}{2}$ times the length of the carapace and rostrum, in the female they are but $3\frac{1}{3}$ to $3\frac{1}{2}$ times this length.

The ambulatory legs are long, very slender, and perfectly smooth.

In the Museum collection are numerous specimens from the Andamans, from the Madras coast, and from off Ceylon at 32 to 34 fathoms.

There are undoubtedly two sorts of males: one sort resembling the female in having the chelipeds comparatively short, the other sort having very long chelipeds.

Lambrus (Rhinolambrus) cybelis, n. sp.

This species closely resembles *L. turriger*, from which it differs only in the following characters:—

- (1) the regions of the carapace are all more elevated, and on the cardiac region—one behind the other, in the middle line—as well as on either branchial region, are two very large semi-erect spines of equal size; while in the middle of the granular posterior border is a single spinule:
- (2) the surface of the carapace, besides being granular, is very evenly and regularly pitted or reticulated:
- (3) the rostrum, which is nearly one-third the greatest breadth of the carapace, is more distinctly trilobed:
- (4) the chelipeds (which in females and young males are only $3\frac{1}{4}$ to $3\frac{1}{2}$ times the length of the carapace and rostrum), though of the same general slender proportions as in *L. turriger*, have the hand distinctly trigonal throughout, and the arm and hand armed with sharp lacinated spines on the upper aspect.

A young male from off Ceylon, 34 fms., and two probably half-grown males, and an ovigerous female, from off the Andamans, 41 to 86 fathoms.

The characters that distinguish this species are constant throughout the series, without any modification or variation.

Greatest length of carapace in ovigerous female	...	15 millim.
Do. breadth do. do. do.	...	15 millim.
Length of chelipeds in ovigerous female	...	52 millim.

Lambrus (Rhinolambrus) petalophorus, n. sp.

Carapace of the same general shape as in *L. turriger*, but broader posteriorly, where its breadth exceeds its length with the rostrum. The hepatic region is extremely well demarcated, not by its prominence, but by its almost vertical outer wall.

The cristiform antero-lateral border, which runs from the angle of the buccal frame outside the limit of the hepatic region, is festooned by 7 or 8 close-set thin teeth, and there is a strong upcurved spine at the postero-lateral angle.

The postero-lateral border carries three teeth, the innermost of which is hardly less prominent than that at the postero-lateral angle: the posterior border is finely denticulated.

The rostrum, the breadth of which is about $\frac{2}{3}$ the greatest breadth of the carapace, is elegantly trilobed.

The regions of the carapace are strongly elevated, and have the surface pitted or reticulated: in the middle line on the gastric region is a single erect conical spine, on the cardiac region two; and on either branchial region there is a spine. In front of the gastric spine are two spinelets, disposed transversely.

The supra-orbital margin is strongly arched, and the infra-orbital lobe is cut into two elegantly crimped leaflets or petals.

The post-ocular constriction is distinct.

The chelipeds in the male are four and-a-half times the length of the carapace and rostrum: the *arm* is slender and subcylindrical, with a line of many spinules along both the inner and outer borders, a broken line of sharp tubercles along its upper surface, and a line of granules along its lower border, but is otherwise smooth and polished: the *carpus* has a few coarse spinules on its outer surface: the *hand*, though distinctly trigonal, is long and slender, but is enlarged at the far end; its inner and outer borders are irregularly and unequally lacinated, the teeth becoming larger and closer set towards the far end; except for a line of beading along its lower border and an occasional spinule on its upper surface, its surfaces are smooth and polished: the movable *finger* has its broad base denticulated.

The ambulatory legs are very slender and very short—only one-

fifth longer than the carapace : except for a line of spinules along the posterior (lower) border of the meropodite they are smooth.

Greatest length of carapace (male) ... 16 millim.

„ breadth „ ... 18 „

Length of cheliped ... 72 „

Off Ceylon in deep-water.

Colours in spirit : chelipeds and legs purplish white, carapace dull slaty purple.

Sub-genus AULACOLAMBRUS, A. M.-Edw.

Aulacolambrus, A. Milne-Edwards, Miss. Sci. Mex. Crust., I. p. 147.

Aulacolambrus, Miers, 'Challenger' Brachyura, p. 97.

Pterygostomian region traversed, from the orbit to the afferent branchial orifice, by a deep channel, which is closed and converted into a tube by thick fringes of hairs : the lateral epibranchial spine is of huge size : the edges of the carapace chelipeds and legs are more or less conspicuously hairy.

Key to the Indian species of the sub-genus *Aulacolambrus*.

- I. Carapace as long as broad, with a projecting rostrum and a distinct post-ocular constriction; its surface closely covered with rasp-like tubercles : carapace and legs not conspicuously hairy..... *L. sculptus*.
- II. Carapace broader than long, its surface irregularly tuberculate; rostrum not or hardly projecting: no post-ocular constriction: margins of carapace, chelipeds and legs fringed with remarkably long tangled hairs.
 1. Antero-lateral border with large spines in front of the large lateral epibranchial spines: spines of inner edge of hand strongly curved upwards and outwards.. *L. curvispinis*.
 2. Antero-lateral border with small teeth in front of the large lateral epibranchial spines: spines of inner edge of hand not curved.
 - a. No spines in middle line of carapace, or on branchial regions..... *L. hoplonotus*.
 - b. Some spines in middle line of carapace, and on branchial regions: spines on outer edge of hand very long..... *L. whitei*.

Lambrus (Aulacolambrus) sculptus, A. M.-Edw.

Lambrus sculptus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 258, pl. xiv. fig. 3.

Lambrus sculptus, Miers, 'Challenger' Brachyura, p. 98.

Lambrus sculptus, J. R. Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 350.

The carapace is triangular, broad behind, and as long as broad. The rostrum is triangular, dorsally grooved and declivous, and tapers

to a rounded point. The regions are elevated, and the median are separated from the branchial by deep furrows: all the regions are closely covered by rasp-like tubercles.

The lateral borders are tubercular, and end posteriorly in a large spine directed outwards and somewhat backwards.

Internal to this large spine is a much smaller spine; and the posterior border is tuberculate.

The chelipeds are a little more than twice the length of the carapace, with the inner and outer borders serrated, and the upper surface covered with tubercles like those on the carapace: amid the serrations five large teeth on the outer border of the hand are very conspicuous.

The ambulatory legs are slender and smooth.

The epistome is sculptured, and is very deeply excavated in the middle line.

The pterygostomian region is traversed by a canal running parallel with the buccal frame: the canal is perfectly smooth, and is closed below, and thus converted into a tube, by thick fringes of long hairs.

I believe, with Ortmann, that this species is very probably identical with *L. pisoides*, Adams and White ('Samarang' Crustacea, p. 28, pl. v. fig. 4), and perhaps with *L. diacanthus* de Haan (Faun. Japon. Crust., p. 92, pl. xxiii. fig. 1).

It is a fairly common species at the Andamans and Nicobars.

Lambrus (Aulacolambrus) hoplonotus, Ad. & Wh.

Lambrus hoplonotus, Adams and White, 'Samarang' Crust., p. 35, pl. vii. fig. 3.

Lambrus hoplonotus, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 258.

Lambrus hoplonotus, Miers, Ann. Mag. Nat. Hist., 1879, Vol. IV. p. 22; and 'Challenger' Brachyura, p. 98.

Lambrus hoplonotus, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 450; and Cat. Austral. Crust., p. 33.

Carapace with the outline in front of the huge lateral epibranchial spine almost semi-circular, the rostrum being extremely short and not breaking through the general outline. The carapace is granular, and has the regions well-defined but not elevated.

The symmetrically rounded antero-lateral margin is regularly festooned with little round teeth of uniform size, and ends at a great projecting lateral epibranchial spine: behind and internal to this spine is another small spine: the posterior border is finely granular. The chelipeds, legs, and margins of the carapace are fringed with long hairs; and the pterygostomian region is channelled just as in *L. sculptus*.

The chelipeds in the male are a little more, and in the female a

little less than three times the length of the carapace: the arms and hands are depressed trigonal, and the fingers small: the *arm* has its inner edge sharply tuberculate, its outer edge strongly 4 or 5-spinate, its lower edge beaded, its upper surface with a row of 4 or 5 large granules: the *wrist* has three strong spines along its outer edge: the *hand* has its inner edge sharply 9 to 11-dentate, its outer edge very strongly 6 to 8-spinate, with small spinules alternating with the large spines, and its lower edge sharply and finely beaded. The ambulatory legs are perfectly smooth.

All our specimens are typical according to Adam and White's figure. This species is common at the Andamans.

Lambrus (Aulacolambrus) curvispinis, Miers.

Lambrus curvispinis, Miers, Ann. Mag. Nat. Hist., Vol. IV. 1879, p. 24; and 'Challenger' Brachyura, p. 98.

This species, which Miers in his latest notice of it considers to be one of the numerous varieties of *L. hoplonotus*, resembles the latter species in every particular except (1) that the rostrum ends in a little bacillar spinule; (2) that the antero-lateral borders of the carapace instead of being crenate are powerfully spinate; (3) that the spines along the inner edge of the palm are strongly hooked upwards and outwards; and (4) that the inner surface of the arm bears a row of spinules.

This species, or variety, which is twice the size of *L. hoplonotus*, is also very common at the Andamans.

Lambrus (Aulacolambrus) whitei, A. M.-Edw.

Lambrus carinatus, Adams and White (*nec* Edw.), 'Samarang' Crust., p. 27, pl. v. fig. 3.

Lambrus whitei, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 260; and Miss. Sci. Mex. Crust., I. p. 147 (foot-notes).

Lambrus whitei, Miers, 'Challenger' Brachyura, p. 98.

In the form of the carapace, the hairiness of the edges of the legs and carapace, and in the presence of the pterygostomial canal, this species almost exactly resembles the two preceding species.

The antero-lateral borders are sharply crenulate and end at a large outwardly and backwardly directed spine, internal to which is another largish spine; while on the posterior border are four largish spines. The carapace is granular, and in the middle line are two conical spines, one on the gastric the other on the cardiac region, while on either branchial region are two similar spines.

The spinature of the chelipeds is, in disposition, similar to that

of *L. hoplonotus*, but the spines, especially those on the outer edge of the hand, are very much longer, slenderer, and more acute.

Several specimens, including ovigerous females, of this small species are in the Museum collection, from Arakan; and from off Ceylon, 34 fathoms.

The figure in Adams and White is an admirable illustration of this species.

Sub-genus *PARTHENOLAMBRUS*, A. M.-Edw.

Parthenolambrus, A. Milne-Edwards, Miss. Sci. Mex. Crust., I. p. 148.

Parthenopoides, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 672.

Parthenolambrus, Miers, 'Challenger' Brachyura, p. 99.

Carapace semi-elliptical or semi-circular, with a nearly straight posterior margin, the postero-lateral angles being strongly produced. Chelipeds of no great length, never sharply serrate, and with the arms and hands indefinitely contorted. The rostrum is more or less deflexed.

Key to the Indian species of the sub-genus *Parthenolambrus*.

- I. Carapace with the hepatic regions very prominent in the antero-lateral margin :—
 1. Carapace broader than long, strongly convex, nodular and eroded: chelipeds less than twice the length of the carapace..... *L. tarpeius*.
 2. Carapace as long as broad, compressed, with cristiform edges, its surface almost devoid of granules: chelipeds more than twice the length of the carapace..... *L. harpaæ*.
- II. Carapace with the hepatic regions distinct, but not markedly prominent :—
 1. Rostrum almost vertically deflexed: ambulatory legs *dentate*, but without true spines..... *L. calappoides*.
 2. Rostrum moderately deflexed, with a prominent median lobe: meropodites of ambulatory legs each with three rows of close sharp spines..... *L. beaumontii*.

Lambrus (*Parthenolambrus*) *calappoides*, Ad. and Wh.

Parthenope calappoides, Adams and White, 'Samarang' Crustacea, p. 34, pl. v. fig. 5.

Lambrus calappoides, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 452; and Cat. Austral. Crust., p. 35.

Lambrus calappoides, Miers, Zoology of H. M. S. 'Alert,' pp. 517 and 527; and 'Challenger' Brachyura, p. 101.

Parthenolambrus calappoides, R. I. Pocock, Ann. Mag. Nat. Hist., 1890, Vol. V. p. 75.

Carapace almost semi-circular in outline, with an indentation

behind the hepatic regions: the regions are well-delimited, but not carinated or sharply raised; and the surface is granular without any very large spines or nodules. The rostrum is deflexed almost vertically. The eyes are sunk in deep orbits with swollen margins. The antero-lateral margins, and sometimes the postero-lateral, are closely festooned or incised, but in an irregular manner.

On either side of the gastric region is a deep hollow; and on either side of the front part of the cardiac region is a deep foramen.

The chelipeds in the male are not twice the length of the carapace: the arm is coarsely spinate along its convex inner border, and the hand still more coarsely and bluntly spinate along its contorted upper border.

Ambulatory legs compressed, the 3rd to 5th joints having the edges irregularly dentate, this being most marked in the case of the last pair.

The animal as a whole has a sort of boiled appearance.

The species is very variable, and owing to frequent and extensive incrustation with barnacles, foraminifera, etc., is very hard to describe.

In the Museum collection are specimens from the Andamaus, Mergui, Avakan, Ceylon, and Malabar coast.

Lambrus (Parthenolambrus) beaumontii, n. sp.

Very near to *Parthenope bouvieri* and *trigona*, A. M.-Edw., (v. Rev. et. Mag. Zool. (2) XXI. 1869, pp. 350-353).

This species comes from deepish water, and is small and very variable — the adult female, especially, being so unlike the male, that if it were found apart, it would be considered distinct.

The carapace is semicircular, the curve being broken (1) by the hepatic regions, and (2) by the projecting middle lobe of the rostrum. The elegantly curved antero-lateral borders are closely festooned by a row of thin, sharp, lacinated teeth, the bases of which are fused together; of these teeth the first three, situated on the hepatic region, are smaller than the others, which are of equal size, except the last, and this forms the summit of the salient upcurved postero-lateral angle. The postero-lateral borders are irregularly serrated, and there is a spinule in the middle of the posterior border. The regions of the carapace are very salient and form three cariniform elevations: there is usually, but not always, in the male, and seldom in the female, a recurved spinule on the gastric region, in the middle line; and generally in the male, but seldom in the female, the conical cardiac region is surmounted by one or two spinules.

The rostrum is trilobed, the small lateral lobes being formed each of a group of granules, and the larger, projecting, median lobe being spatulate, smooth, and somewhat deflexed.

The surface of the carapace is somewhat granular and eroded, but this is often concealed by a glazing of stony algæ.

The orbits have the edges finely and evenly serrate. The third joint of the antennal peduncle is spiniferous.

The segments of the sternum, as also the abdominal terga, are all deeply cut, and their surface, like that of the external maxillipeds and pterygostomian regions, is very sharply, closely and evenly granular.

The chelipeds in the male are $2\frac{2}{3}$ times the length of the carapace; in the female hardly twice that length: in both sexes they are top-heavy, owing to the distal enlargement of the palm and the great size of the fingers; they are everywhere granular, but most markedly so on the under surface: the inner border of the arm and palm, and the upper border of the movable finger, are irregularly spinulate, the outer border of the hand may have two or three irregularly disposed blunt teeth, and that of the arm a few spicules. The ambulatory legs characterize this species, for the meropodites, in all, are compressed-trigonal with all three edges strongly, sharply and closely spinate; the anterior, and often also the posterior, margins of the next two joints also are spinate or dentate.

	Male.	Female.
Greatest length of carapace	... 10.5 millim.	9 millim.
„ breadth „	... 10.5 „	9 „
Length of chelipeds	... 29 „	15.5 „
Loc. Off Ceylon 32-34 fms., and off the Andamans, 41 fms.		

Lambrus (Parthenolambrus) tarpeius, Ad. and Wh.

Lambrus tarpeius, Adams and White, 'Samarang' Crust., p. 35, pl. vii. fig. 2.

Lambrus tarpeius, Miers, 'Challenger' Brachyura, p. 99.

Carapace covered with numerous large nodules, and with the division into three lobes—a median and two lateral—well-marked. The hepatic region not only projects very strongly forwards, but is brought into greater prominence by the fact that the carapace is somewhat contracted behind the eyes, and excavated and constricted behind the hepatic regions themselves: the antero-lateral margins are crenulate; the produced postero-lateral angle ends in a rounded lobe-like spine, and the posterior and postero-lateral margins are irregularly and bluntly toothed.

The rostrum, which is deeply excavated and considerably deflexed, ends in a blunt point.

The chelipeds are massive and nodular, but even in the male are only about half as long again as the carapace.

The ambulatory legs have the 3rd, 4th and 5th joints compressed and irregularly dentate along one or both edges.

Our specimens, which are rather damaged, come from the Andamans to 20 fathoms, and from off Colombo, 26½ fathoms.

Lambrus (Parthenolambrus) harpax, Ad. and Wh.

Lambrus harpax, Adams and White, 'Samarang' Crustacea, p. 25, pl. vi. fig. 3.

Lambrus harpax, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 450; and Cat. Austral. Crust., p. 32.

Lambrus harpax, Miers, Zoology H. M. S. 'Alert,' pp. 182 and 202; and 'Challenger' Brachyura, p. 99.

Male. Carapace depressed semi-elliptical, as long as broad, its surface almost smooth. The median region is carinated, the carina bifurcating anteriorly to enclose an elongate-triangular depression behind the eyes, and carrying a large spine in the gastric region (at the point of bifurcation), another large spine in the cardiac region, and a much smaller spine in front of the latter.

The lateral margins are cristiform, with a series of crenations and sutures indicating fused teeth; and the hepatic region is prominent, with a cristiform edge: the postero-lateral angle is surmounted by an upturned lacinated tooth, the postero-lateral margins are dentate, and on the posterior border is a triangular tooth with an obscurely trilobed tip: from the bluntly lacinated tooth of the postero-lateral angle a carina runs obliquely forwards and inwards onto the posterior part of the branchial region.

The rostrum is strongly deflexed, and ends in an obscurely and unevenly trilobed tip. The chelipeds in the male are nearly $2\frac{1}{2}$ times the length of the carapace, and are thin and compressed, with sharp, almost cristiform, edges: in the *arm* both the inner and outer edges are unevenly dentate, and the lower edge faintly granular: the *carpus* has the outer edge compressed and crenulate: the thin *hand* has its inner edge crenulate, has a curved line of granules on its inner surface, and some granules on its outer surface: the movable *finger* has its upper edge crenulated at base. The ambulatory legs are compressed, with the 3rd, 4th and 5th joints cristated above, especially in the last two pairs: in the last pair these joints have both margins rather strongly dentated.

Our specimen is from the Andamans.

Miers (Zoology H. M. S. 'Alert,' p. 202) considers *L. sandrockii*,

Haswell (P. L. S., N. S. Wales, Vol. IV. 1879, p. 452, pl. xxvii. fig. 2) to be identical with this species.

PARTHENOPE, Fabr.

Parthenope, Milne-Edw., Hist. Nat. Crust., I. 359, (v. *synon.*)

Parthenope, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 668.

The form and structure of the carapace is somewhat similar to that of *Parthenolambrus*; but the genus is distinguished from *Lambrus* by the nature of the so-called basal antennal joint, which is relatively long, and nearly reaches to the level of the inferior orbital hiatus: the fingers also are much less turned inwards.

Key to the Indian species of the genus *Parthenope*.

- I. Carapace remarkably rugose or spinose: chelipeds nearly of the ordinary *Lambrus* form, and beset with huge spines: ambulatory legs strongly spinate:—
 1. Carapace and chelipeds beset with coarse tubercles and spines: carapace about $\frac{3}{4}$ as long as broad..... *P. horrida*.
 2. Carapace and chelipeds beset with spines, which are sharp and lacinate on the chelipeds: carapace only $\frac{2}{3}$ as long as broad *P. spinosissima*.
- II. The whole body and all the appendages beset with delicate papilliform tubercles which unite to form a lace-work or frosting: chelipeds tapering, with long slender spiny fingers, nearly as long as the palm (sub-genus *Parthenomerus*)..... *P. efflorescens*.

Parthenope horrida, Fabr.

Rumph, Amboin. Rariteitk. ix. 1.

? Seba, III. xix. 6-7.

Cancer horridus, Linn. Syst. Nat. II. 1047, 43.

? *Cancer horridus*, Herbst, I. ii. 222, tab. xiv. fig. 88.

Parthenope horrida, Fabr., Suppl., 353.

Parthenope horrida, Leach, Zool. Misc., II. 107.

Parthenope horrida, Desmarest, Consid. Crust., p. 143, pl. xx. fig. 1.

[*Parthenope horrida*, Guérin, Icon. R. A., pl. vii. fig. 1.]

Parthenope horrida, Milne-Edwards, Hist. Nat. Crust., I. 360.

Parthenope horrida, Cuv. Regn. An., pl. xxvi. fig. 2.

Parthenope horrida, A. Milne-Edwards, Nouv. Archiv. du Mus., VIII. 1872, p. 255.

Parthenope horrida, Martens, Archiv. fur Naturges., XXXVIII. 1872, p. 86 (note on habitat).

Parthenope horrida, Miers, Phil. Trans., Vol. 168, p. 486.

Parthenope horrida, Nauck, Z. Wiss. Zool., XXIV. 1880, p. 44 (gastric teeth).

Parthenope horrida, C. W. S. Aurivillius, Kongl. Sv. Vet. Ak., Handl. XXIII. No. 4, 1888-89, p. 60.

[*Parthenope horrida*, F. Muller, Verh. Ges., Basel., VIII. p. 473].

Carapace somewhat pentagonal; its length not quite $\frac{3}{4}$ its breadth; its surface deeply eroded, strongly rugose, and sharply tubercular: its postero-lateral angle much produced outwards: antero-lateral margin coarsely spinate: postero-lateral and posterior margins granular, the former with a coarse spine. Rostrum short, moderately deflexed, ending in a blunt inter-antennular tooth. Orbits circular, deep.

Chelipeds huge, one much larger than the other, the larger twice the length of the carapace (in the female), covered with large coarse granular spines.

Ambulatory legs stout, spiniferous; the dactylus smooth: the meropodite, in all, is compressed-trigonal, with all the edges spinate.

The under surface of the body has a worm-eaten appearance: the sternum is deeply pitted, with a deep crescentic excavation between the chelipeds.

The abdomen (of the female) with a series of deep excavations along either side.

Off Ceylon, 34 fathoms.

Parthenope spinosissima, A. M.-Edw.

Seba, III. xxii. 2 and 3.

Parthenope spinosissima, A. M.-Edw., in Maillard's l'île Réunion, Annexe F, p. 8, pl. xviii.

Parthenope spinosissima, Alcock, J. A. S. B., 1893, Pt. ii. p. 177.

Carapace in the form of an equilateral triangle, its length only about $\frac{2}{3}$ its breadth; its surface strongly rugose, and sharply tubercular and spinate: the antero-lateral borders are armed with large lacinate spines; the posterior and postero-lateral borders are sharply spinate: the strongly-produced and spinate postero-lateral angle runs forwards as a carina onto the branchial regions.

The three lobes of the gastric region are greatly inflated.

The rostrum is vertically deflexed, and ends in a strong sharp inter-antennular spine.

The chelipeds are very little asymmetrical, and are beset, nearly up to the tips of the fingers, with great ramose and lacinate spines.

The ambulatory legs are armed with extremely sharp teeth almost up to the tip of the dactylus.

The abdomen of the female has a median double series, and on either side a single series, of sharp spines.

A male and female from the Bay of Bengal, 88 fathoms.

Sub-genus *PARTHENOMERUS*, *nov.*

Characterized by the chelipeds, which have a thigh-shaped meropodite, and taper to the fingers, which are nearly as long as the palm, and are extremely slender.

Parthenope (Parthenomerus) efflorescens, n. sp.

Carapace triangular, not quite $\frac{3}{4}$ as long as broad; its entire surface, above and below, as also that of the sternum, of the abdomen (in the female), and of all the exposed appendages—from the eye-stalks to the last pair of ambulatory legs, covered with a lace-work, or frosting, formed by the partial contact of very delicate crisply paxilliform granules. There are no large tubercles, and, except on the arm, hand and fingers, no spines. On the arm, namely, there are two or three teeth with acicular tips, on both the lower-inner, and the upper-inner borders; on the hand there are three needle-like teeth on the upper-inner, and three on the lower-inner borders; and the fingers are everywhere beset with long needle-like spines. The rostrum is nearly vertically deflexed.

Only one cheliped remains in our unique specimen; and it, which is a little over twice the length of the carapace, has a most curious tapering form: the meropodite is huge and thigh-shaped, decreasing in size distally; the carpus is slenderer than the end of the meropodite; and the hand is still slenderer than the carpus: the fingers are long—nearly as long as the palm—are extremely slender, and, as already noted, are beset with long slender spines.

A single female, from the Andaman Sea, 36 fathoms.

CRYPTOPODIA, Edw.

Cryptopodia, Milne-Edwards, Hist. Nat. Crust., I. 360.

Cryptopodia, Miers, Journ. Linn. Soc. (Zool.), XIV. p. 669.

Cryptopodia, Miers, 'Challenger' Brachyura, p. 101.

Carapace very broadly triangular, with very large lateral clypeiform vaulted expansions which completely conceal the ambulatory legs, and are prolonged posteriorly far beyond the base of the abdomen; a large space between the gastric and the cardiac regions is triangular and concave. The rostrum is nearly horizontal, spatuliform and very prominent. The pterygostomian regions are smooth, not ridged. The orbits are very small, nearly circular, with a suture in the superior margin. The epistome is well developed; the antennular fossæ are narrow and somewhat oblique. The abdomen, in the male, is five-jointed; the third to fifth segments coalescent. The eyes are very small and retractile. The basal antennal joint is slightly dilated and does not nearly reach the internal orbital hiatus, which is filled by the second joint. The buccal cavity and external maxillipeds are small. The ischium-joint of the maxillipeds is not produced at its antero-internal angle; the merus is distally truncated, with the antero-external angle slightly produced, the interior margin notched below the antero-internal angle. The chelipeds are nearly as in *Lambrus*; the merus-joint has a wing-like lobe on the posterior margin near to the distal extremity; the

palms of the chelipeds are elongated, tricarinated, and dentated (as in *Lambrus*); fingers short. The ambulatory legs are slender, decrease successively but slightly in length, and have the fourth, fifth and sixth joints more or less distinctly carinated; dactyli nearly straight.

Cryptopodia fornicata, (Fabr.)

Cancer fornicatus, Fabr., Ent. Syst., II. 453.

Cancer fornicatus, Herbst, I. ii. 204, pl. xiii. figs. 79-80.

Parthenope fornicata, Fabr., Suppl., p. 352.

Maia fornicata, Latr., Hist. Nat. Crust., VI. 104.

Oethra fornicata, Desmarest, Consid. Crust., p. 110.

Cryptopodia fornicata, Milne-Edwards, Hist. Nat. Crust., I. 362 (*v. synonym.*)

Cryptopodia fornicata, de Haan, Faun. Japon. Crust., p. 90, pl. xx. figs. 2 and 2a; and (?) Adams and White, 'Samarang' Crust., p. 32, pl. vi. fig. 4; and Dana, U. S. Expl. Exp. Crust., pt. I, p. 140; and Stimpson, Proc. Ac. Nat. Sci., Philad., 1857. p. 220; and Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 454; and Cat. Austral. Crust., p. 37; and E. Nauck, Z. Wiss. Zool., 1880 (gastric teeth); and Miers, Zool. H.M.S. 'Alert,' pp. 182 and 203; and 'Challenger' Brachyura, p. 102; and A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 109; and J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 351.

Carapace broadly triangular, depressed: the antero-lateral margins more or less lacinated, the posterior and postero-lateral margins forming one strong curve, the edge of which is either unbroken or shows very faint traces of crenulation: the surface of the carapace is in the main smooth, but the triangular depression is a little pitted and is bounded by lines of granules, the lateral lines being produced well across the branchial regions. The rostrum is prominent, blunt-pointed, about as long as broad, and has its edge very faintly crenulate.

The chelipeds are considerably less than twice the length of the carapace, and have massive sharply trigonal joints, with most of the edges strongly cristiform; and the fingers are massive and strongly incurved as in *Lambrus*: in the *arm*, the cristiform inner and outer edges are sharply lacinate, the latter being strongly alate, while the lower edge is beaded: in the *carpus* the outer edge only is cristiform: in the hand both the inner and outer edges are strongly cristiform and lacinate, the lower edge being crenate.

The ambulatory legs have both edges of the merus raised into spiniform crests, and the upper edges of the next two joints carinate.

In the Museum collection are numerous specimens from Palk Straits, Andamans and Persian Gulf.

Cryptopodia angulata, Edw. and Lucas.

Cryptopodia angulata, Edw. and Lucas, Archiv. du Mus., Vol. II. 1841, p. 481, pl. xxviii. figs. 16-19.

Carapace convex, sharply pentagonal, with all the edges deeply

dentated, and all the angles produced to form curved spines; in addition there is a second spine in front of the spine of either antero-lateral angle, and the part of the posterior border that is co-extensive with the abdomen is demarcated on either side by a strong spine. The rostrum ends in a sharp point. The triangular depression of the carapace is very deep, and the lines which bound it are granular; there is an irregular patch of granules on either branchial region, and there is a line of granules passing forwards from the apex of the triangular depression to the base of the rostrum on either side.

The chelipeds are much as in *C. fornicata*, with the exception that the carpus is semi-globular, and that the inner and outer margins both of the hand and arm are armed with sharp lacinate spines. The ambulatory legs have the merus simply carinate above, spinate-carinate below, the carpus and propodite carinate, and the dactylus strongly carinate on both edges so as to form a swimming blade.

Orissa coast, 20-25 fathoms. Malabar coast, 28 fathoms.

In a large male from the Malabar coast, the carapace is much more granular; and the chelipeds have the spinature much more acute and lacinate, and their surfaces—especially the under surface—granular instead of nearly smooth.

Cryptopodia angulata, var. *cippifer*, nov.

In this variety the only differences are: (1) that the semi-globular carpus has a few granules on its upper surface; and (2) that the triangular hollow in the middle of the carapace is rather deeper, and has certain large erect definitely-placed spines on the ridges that bound the hollow, namely,—two close together side by side in the middle line, in front; one at either branchial angle; and one in the middle line posteriorly, on the summit of the cardiac region.

These spines are present in six specimens of both sexes, but are most pronounced in the male.

Loc. Karáchi.

The largest specimen, female, has an extreme breadth of carapace of 45 millim.

HETEROCRYPTA, Stimpson.

Heterocrypta, Stimpson, Ann. Lyc. Nat. Hist., New York, Vol. X. 1874, p. 102.

Heterocrypta, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 166.

Heterocrypta, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 669; and 'Challenger'

Brachyura, p. 102.

Differs from *Cryptopodia* in the following characters:—

The posterior border of the carapace slightly overlaps the abdomen, but is not distinctly produced; the lateral clypeiform expansions are also less produced, so that the legs when even moderately extended can be seen beyond them.

The pterygostomian and sub-hepatic regions are traversed by a granular ridge which runs parallel to the antero-lateral border from the angle of the buccal cavity to the base of the chelipeds.

Heterocrypta investigatoris, n. sp.

Carapace broadly pentagonal; the posterior border almost straight, and crenulated; the other borders sharply dentate. The central depression of the carapace is semi-circular and very deep, with the boundary raised into a carina: the horns of the semi-circle end each in a boss or mammillary tubercle, from which a carina runs backwards to the posterior angle of the carapace. The rostrum is very large and prominent, shaped like a leaf: its surface is smooth: that of the carapace is either smooth or granular—the granules, when present, being most abundant on the posterior part of the branchial regions.

The chelipeds, which are twice the length of the carapace, have both the inner and outer edges of the arm sharply dentate (but not alate as in *Cryptopodia*), and the lower edge beaded: the *carpus* is sub-globular: the *hand* has both the inner and the outer edges bluntly dentate, and the under surface closely covered with bead-like granules.

The ambulatory legs have the upper edges of the 3rd, 4th, and 5th joints sharply carinate: the meropodite also, in the case of the first two pairs of legs, has a single row of teeth or spines along its lower edge, and in the case of the last two pairs of legs has a double row of spines along the lower edge.

Like all the species of this genus, this species is small, the breadth of the carapace in the largest specimen being 18 millim.

It is not uncommon off rocky parts of the coasts of India up to and about 30 fathoms. It would seem to be allied to the *Cryptopodia contracta* of Stimpson (Proc. Ac. Nat. Sci., Philad., 1857, p. 220).

OETHRA, Leach.

Oethra, Leach.

Oethra, Milne-Edwards, Hist. Nat. Crust., I. 370.

Oethra, A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 170 (v. *synon.*).

Oethra, Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 669.

The carapace is regularly oval (transversely), with its surface strongly rugose, and its antero-lateral edges somewhat upturned. The

rostrum is obsolete, not breaking the general oval outline. The eyes are small; and the orbits are nearly circular, with two sutures in the upper border, and a hiatus at the inner inferior angle, which is filled by the second joint of the antennary peduncle.

The antennular fossæ are squarish, and are nearly filled by the large angular basal joint, internal to which the rest of the antennule folds obliquely.

The basal antennal joint is oblong and angular, and reaches to the internal orbital canthus: the antennary flagella are rudimentary.

The external maxillipeds completely close the buccal frame: their inner border is extremely straight and sharp cut: their palp is inserted at the antero-internal angle of the merus, and folds out of sight.

The chelipeds are about equal in length to the carapace: they have somewhat the *Lambrus* form—having sharply prismatic joints and large inturned fingers, but are concave on the upper surface.

The ambulatory legs are short, and decrease gradually in length: they are all strongly dentate-carinate, or cristate.

The abdomen of the female (and young male) consists of seven segments.

Oethra scruposa, L.

[*Cancer scruposus*, Linn., Mus. Lud. Ulr., p. 450.]

Cancer polynome, Herbst, III. ii. 23, tab. liii. figs. 4-5.

[*Oethra depressa*, Lamk., Hist. Anim. Sans. Vert., V. 265.]

Oethra depressa, Desmarest, Consid. Crust., p. 110, pl. x. fig. 2.

[*Oethra depressa*, Guérin, Icon. R. A., pl. xii. fig. 3.]

Oethra scruposa, Milne-Edwards, Hist. Nat. Crust., I. 371.

Oethra scruposa, Cuv., R. A., pl. xxxviii. fig. 2.

Oethra scruposa, Stimpson, Proc. Ac. Nat. Sci., Philad., 1857, p. 221.

Oethra scruposa, A. M.-Edw., in Maillard's l'île Réunion, Annexe F., p. 3; and Nouv. Archiv. du Mus., VIII. 1872, p. 263.

Oethra scruposa, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 351.

[*Oethra scruposa*, F. Muller, Verh. Ges., Basel, VIII. 473.]

(*Oethra scruposa*, var. *scutata* A. Milne-Edwards, Miss. Sci. Mex., Crust., I. p. 170, pl. xxxi. fig. 2 = *Oethra scutata*, S. I. Smith, Amer. Journ. Sci., etc., XLVIII. 1869, p. 120; and Ann. Mag. Nat. Hist., 1869, Vol. IV. p. 230, is considered by M. A. Milne-Edwards to be only a variety of the Linnæan type.)

The antero-lateral borders are divided into 6 or 7 indistinct lobes by deep narrow sutures, each fold being again subdivided near the edge by a faint crest.

The gastric region is extremely prominent, and is divided into two lobes by a broad longitudinal channel, each lobe being sparsely granular: the branchial regions are also somewhat convex near their middle, the

convexities being granular: the rest of the carapace is somewhat concave.

The chelipeds and ambulatory legs are rough: the chelipeds have the lower edge sharply dentate, and the outer edge of the carpus sharply dentate: the ambulatory legs have the 3rd, 4th and 5th joints carinate or cristate above, and the 3rd and 5th joints cristate below: the dactyli are cristate on both edges, and end in little claws.

The abdomen is deeply sculptured.

In the Museum collection is a male from the Andamans, and a female from Ceylon.

Sub-family II. EUMEDONINÆ, Miers.

Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 670.

Carapace rhomboidal or pentagonal, with a spine at the junction of the antero-lateral and postero-lateral borders. Rostrum usually bifid or emarginate. Surface of carapace nearly flat. Chelipeds of moderate size and length.

Key to the Indian genera of the sub-family EUMEDONINÆ.

- I. Floor of the orbit not in contact with the front, but leaving a hiatus which is more or less filled by the second joint of the antennal peduncle. Chelipeds armed with large spines: ambulatory legs compressed:—
 1. Spine of antero-lateral angle of carapace directed forwards..... ZEBRIDA.
 2. Spine of antero-lateral angle directed straight outwards; last pair of legs dorsal in position... EUMEDONUS.
- II. Floor of the orbit meeting the front, so as to completely exclude the antennal peduncle from the orbit: chelipe? not armed: ambulatory legs not compressed..... CERATOCARCINUS.

ZEBRIDA, Adams and White.

Zebrida, Adams and White, 'Samarang' Crustacea, p. 23.

Zebrida, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 670.

Carapace sub-rhomboidal, flattened, with the rostrum formed by two large, acute, laminar, almost parallel teeth; and with the antero-lateral angles produced to form two similar laminar teeth projecting forwards in a plane parallel to the rostrum.

Orbits circular, their inner canthus being filled by part of the antennal peduncle.

The antennules fold obliquely. The antennæ are entirely concealed beneath the rostrum: their flagellum is well developed; and their basal joint is longish, reaching to the inner canthus of the orbit.

The chelipeds are stout but short, the legs are compressed, and both are armed with large laminar spines of the same type as those that form the rostrum and the antero-lateral margins of the carapace. The ambulatory legs are subchelate much as in *Acanthonyx*.

Zebrida adamsii, White.

Zebrida adamsii, White, P. Z. S., 1847, p. 121; and Ann. Mag. Nat. Hist., 1848, Vol. I. p. 223; and 'Samarang' Crustacea, p. 24, pl. vii. fig. 1.

Zebrida adamsii, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 351.

Zebrida longispina, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 454, pl. xxvii. fig. 3; and Cat. Austral. Crust., p. 38.

Body of a light delicate madder pink, the carapace with darker (liver-coloured) parallel longitudinal bands and alternating streaks, the legs and chelipeds with broad somewhat oblique cross-bands of the same darker colour: the median longitudinal dark band, and a band on either side of it, extend, discontinuously, from the carapace along the abdomen.

The entire integument of the body and limbs is smooth, hard, and polished. The chelipeds are stout, with short squat joints: the *arm* is trigonal with sharp-cut laminar edges, the upper and lower of which end in sharp teeth; its broad distal end is also dentate: the *wrist* is surmounted by three laminar teeth disposed in a triangle: the *hand* has its upper edge raised into a compressed tooth.

Of the ambulatory legs the 3rd, 4th, and 5th joints are strongly compressed, with the upper edges sharply and acuminate carinate; the fifth joint is enlarged distally, and the strongly recurved dactylus is retractile against it in the manner of a subchela.

In the Museum collection are a male and female from the coast of Travancore.

EUMEDONUS, Edw.

Eumedonus, Edw., Hist. Nat. Crust., I. 349.

Eumedonus, Miers, J. L. S., Zool., Vol. XIV. 1879, p. 670.

Carapace depressed, pentagonal: rostrum large, strongly prominent, bifurcate only near the tip. Orbits circular; their internal hiatus occupied by part of the antennal peduncle. Antennules folding obliquely; their basal joint of large size.

Antennæ entirely concealed beneath the front; both the peduncle and the flagellum short. Chelipeds more massive than the other legs, and in the male much longer; armed with large spines. Ambulatory legs compressed; their third joint cristate; the second pair a little shorter than the third; the fifth pair dorsal in position. The abdomen in both sexes consists of seven separate segments.

Eumedonius zebra, n. sp.

Carapace, in spirit, of a yellow colour, and traversed fore-and-aft by five broad parallel liver-coloured bands—a median and two lateral: the median and the inner lateral band on either side being continued a certain distance on to the abdomen.

The carapace is sharply pentagonal, the antero-lateral angles being sharp and directed straight outwards.

The rostrum forms a long, broad, sub-triangular lamina bifurcated near the tip.

The chelipeds in the female are about the same length as the carapace: the ischium has a sharp tooth on its inner border, the merus has one on its inner and one on its upper margin, the carpus has a very strong one on its upper border, and the hand has two on its upper border: the legs have the merus strongly compressed, with the upper border dentate or cristate, and the dactyli are strongly recurved.

Two ovigerous females from off Ceylon, 32 fms: the extreme length of the carapace of the larger specimen is 10 millim.

CERATOCARCINUS, Adams and White.

Ceratocarcinus, Adams and White, Proc. Zool. Soc., p. 57, 1847; and 'Samarang' Crust., p. 33.

Ceratocarcinus, Miers, Journ. Linn. Soc., (Zool.) XIV. p. 670, 1879; and 'Challenger' Brachyura, p. 104.

Carapace sub-hexagonal, about as broad as long, with the dorsal surface nearly flat, spinose or tuberculated. The spines of the rostrum are elongated, acute, and separated by a rather wide interspace, and there is a well-developed lateral epibranchial spine. The orbits are small and circular, and the sub-ocular lobe joins the front, so as completely to exclude the antennæ from the orbits. The basal joint of the antennæ is slender and like the greater part of these appendages is hidden beneath the front. The external maxillipeds are small, the ischium-joint not produced at its antero-internal angle, the merus distally truncated, not produced at the antero-external angle, and scarcely emarginate at the antero-internal angle, where the next joint articulates. The chelipeds are relatively slender and somewhat elongated, with the joints not dilated, the merus and carpus sometimes armed with spines; the dactyli acute and shorter than the palms; the ambulatory legs are slender, with the joints not dilated, the merus sometimes armed with a distal spine; the dactyli nearly straight.

Ceratocarcinus longimanus, Ad. and Wh.

Ceratocarcinus longimanus, White, P. Z. S., 1847, p. 57; and Ann. Mag. Nat. Hist., 1847, Vol. XX. p. 62; and 'Samarang' Crustacea, p. 34, pl. vi. fig. 6.

Ceratocarcinus longimanus, Miers, 'Challenger' Brachyura, p. 105.

Carapace hexagonal: the spines of the rostrum far apart: lateral angles of the carapace in the form of stout outstanding spines the tips of which are turned forwards: a pair of sharp tubercles in the middle line behind the rostrum—these being tufted with hairs.

Chelipeds stout, about twice the length of the carapace and rostrum, finely granular, and longitudinally grooved.

A single specimen of this small species, from the Malacca Straits, is in the Museum Collection.

Appendix to sub-family ACANTHONYCHINÆ.

MENÆTHIOPS, n. gen.

Closely allied to *Menæthius*.

Carapace pyriform, its surface smooth beneath a pubescent covering. The rostrum consists of two acute slender spines of moderate length, which are in the closest contact throughout.

The eyes, which are movable forwards but not retractile, are in great part concealed beneath a large, very conspicuous, laminar supra-ocular spine. No post-ocular spine. [A spinule is present on the ventral aspect of the hepatic region of the single species.] The basal antennal joint is broad; and the mobile portions of the antennæ are visible, from above, on either side of the rostrum.

The external maxillipeds have the merus as broad as the ischium, and the palp inserted at the antero-internal angle of the merus.

The ambulatory legs, of which the first pair are longer than the rest, have strongly recurved prehensile dactyli.

The chelipeds in the female (male unknown) are not enlarged.

The abdominal segments in the female appear to be all distinct.

This genus has a superficial resemblance to *Oregonia*, Dana; but in *Oregonia* there is a large post-ocular spine, quite distinct from the hepatic angle, and the eyes are said to be retractile against this spine.

Menæthiops bicornis, n. sp.

Body and legs tomentose, with additional long scattered setæ.

Carapace pyriform, somewhat *Achæus*-like in shape, there being a slight constriction behind the eyes, and another slight constriction behind the hepatic regions: the gastric and cardiac regions very prominent, the branchial regions prominent: the surface, when denuded, smooth, except for a granular ridge on the pterygostomian regions; the hepatic regions are laterally rather prominent, and carry a small spinule

visible from above, on the ventral aspect of the antero-external angle, as well as a much smaller spinule on the dorsal aspect. There is also a spinule, in the middle line, on the gastric region, and one on the cardiac region, as well as one near the middle of either branchial region.

The rostrum consists of two slender acute spines, which are about one-fourth the length of the carapace proper, and are in the closest contact up to the very tips.

The eyes are movable forwards but are quite non-retractile backwards, and are in great part concealed beneath a large laminar supra-ocular spine, which has its anterior angle produced forwards and its posterior angle produced outwards. No post-ocular spine.

[The spinule on the ventral surface of the hepatic angle is in no sense a post-ocular spine.]

The basal antennal joint is broad and has its outer edge irregularly wavy, somewhat as in Dana's figure of *Oregonia gracilis* (U. S. Expl. Exp., Crust., I. pl. iii, fig. 2b.); its sharp antero-external angle is, like the following joints and the flagellum, plainly visible, from above, beside the rostrum: the mobile portion of the antenna is rather more than half the length of the carapace and rostrum.

The chelipeds in the female are not stouter than the other legs, and are shorter than the carapace and rostrum: their palm is nearly twice the length of the fingers, which meet only at the tip.

The ambulatory legs all have slender joints and a strongly recurved prehensile dactylus: the first pair, which are the longest, are, in the female, a little longer than the carapace and rostrum.

A single egg-laden female has the following dimensions:—

Length of carapace and rostrum	...	...	6·2 + 2 = 8·2	millim.
Greatest breadth of carapace	...	...	6·0	„
Length of chelipeds	...	...	7·0	„
Length of first ambulatory legs	...	...	8·5	„

Loc. Káráchi.

The place of the above genus in the "Key to the Indian genera of the sub-family *Acanthonychinae*" (pp. 190 and 191 *ante*), is with *Huenia* and *Menæthius*, from both of which it is easily diagnosed (1) by the *Pisa*-like rostrum, consisting of two sharp slender spines in the closest contact throughout their extent, and (2) by the large antennary flagellum and by the eroded outer edge of the basal antennal joint. It has, indeed, the closest natural relations with *Menæthius*.

The unique specimen has only just been received along with the "Investigator" collections of the season 1894-95.

EXPLANATION OF PLATES.

PLATE III.

- Fig. 1. *Lambrachæus remifer*, ♂.
,, 2. *Physachæus ctenurus*, ♂; 2a. abdomen of ♀ × 4; 2b. abdomen of ♂ × 4.
,, 3. *Physachæus tonsor*, ♀.
,, 4. 4a. *Grypachæus hyalinus*, ♀.

PLATE IV.

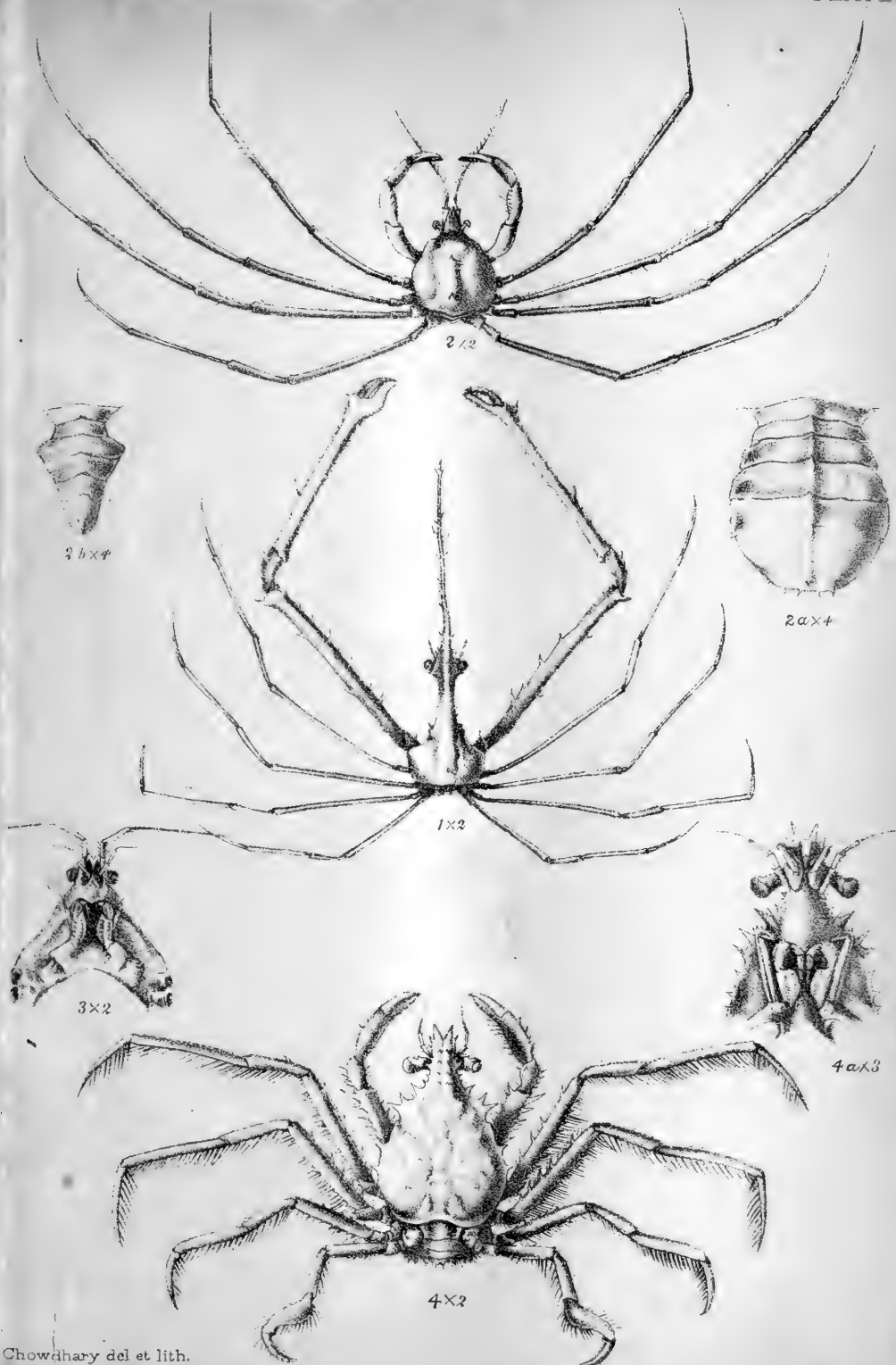
- Fig. 1. 1a. *Inachoides dolichorhynchus*, ♂.
,, 2. 2a. *Apocremnus indicus*, ♂.
,, 3. *Naxia investigatoris*, ♂.
,, 4. *Macroceloma nummifer*, ♂.
,, 5. *Maia gibba*, ♂.

PLATE V.

- Fig. 1. *Achæus cadelli*, ♂.
,, 2. 2a. *Chorilibinia andamanica*.
D / ,, 3. *Callodes malabaricus*, ♀.
,, 4. 4a. *Paratymolus hastatus*, ♀.







A. C. Chowdhary del et lith.

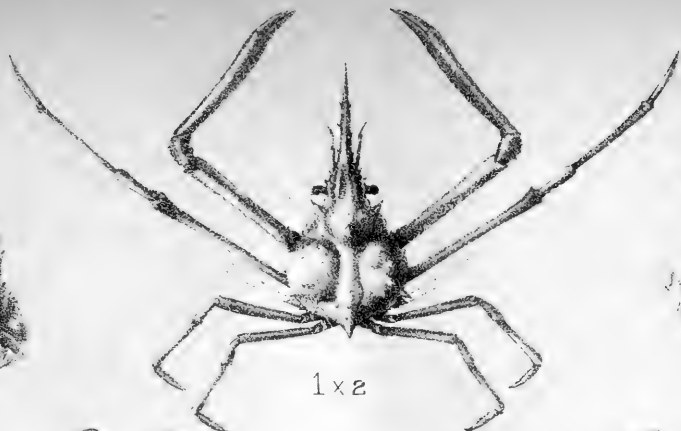
1. *Lembrachæus ramifer*.
3. *Physachæus tonsor*.

2. *Physachæus ctenurus*.
4. *Grypachæus hyalinus*.





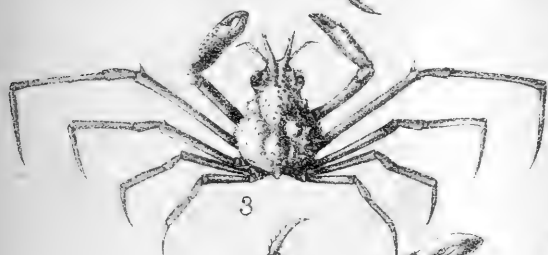
1a x 3



1 x 2



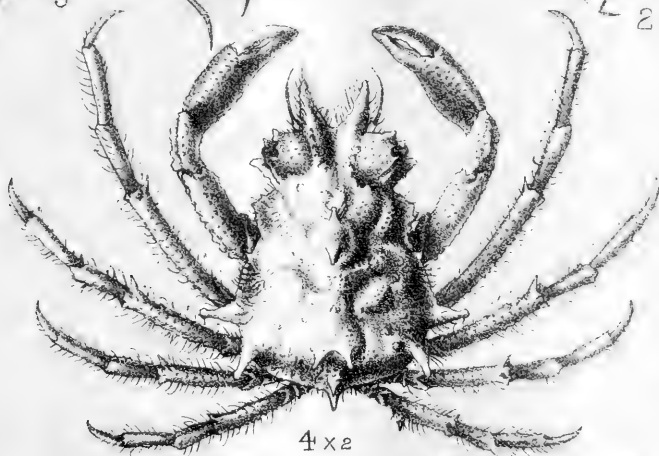
2a x 4



3



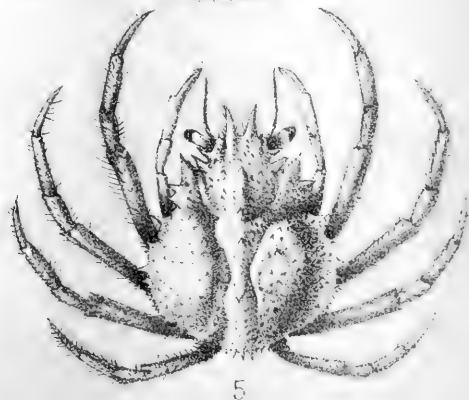
2 x 2



4 x 2



5a x 2



5

Chowdhary & S.C. Mondul del et lith.

1. *Inachoides dolichorhynchus*.

3. *Naxia investigatoris*.

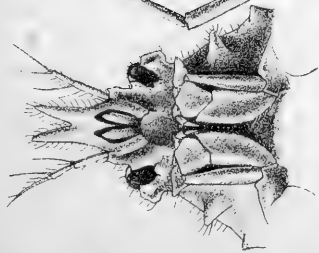
5. *Maia*

2. *Apocremnus indicus*.

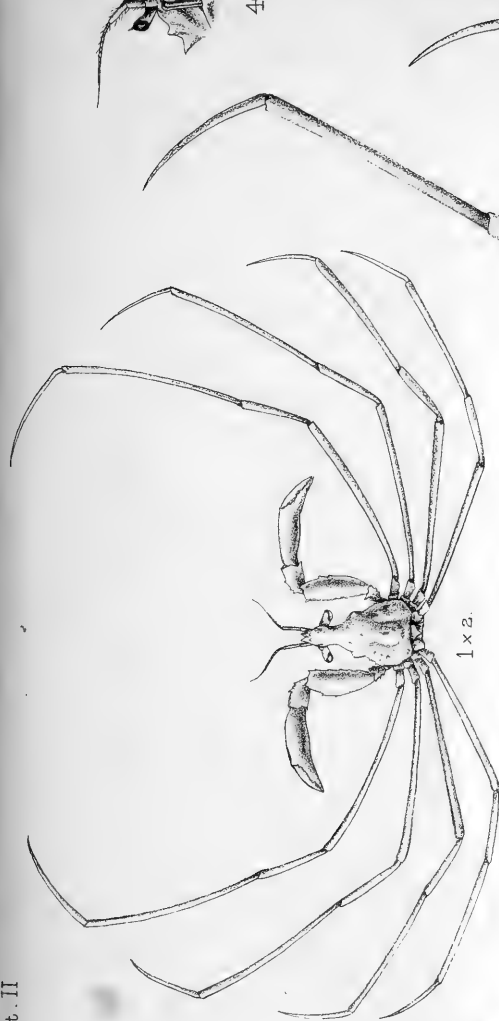
4. *Macrocoeloma nummifer*. ♂

gibba.

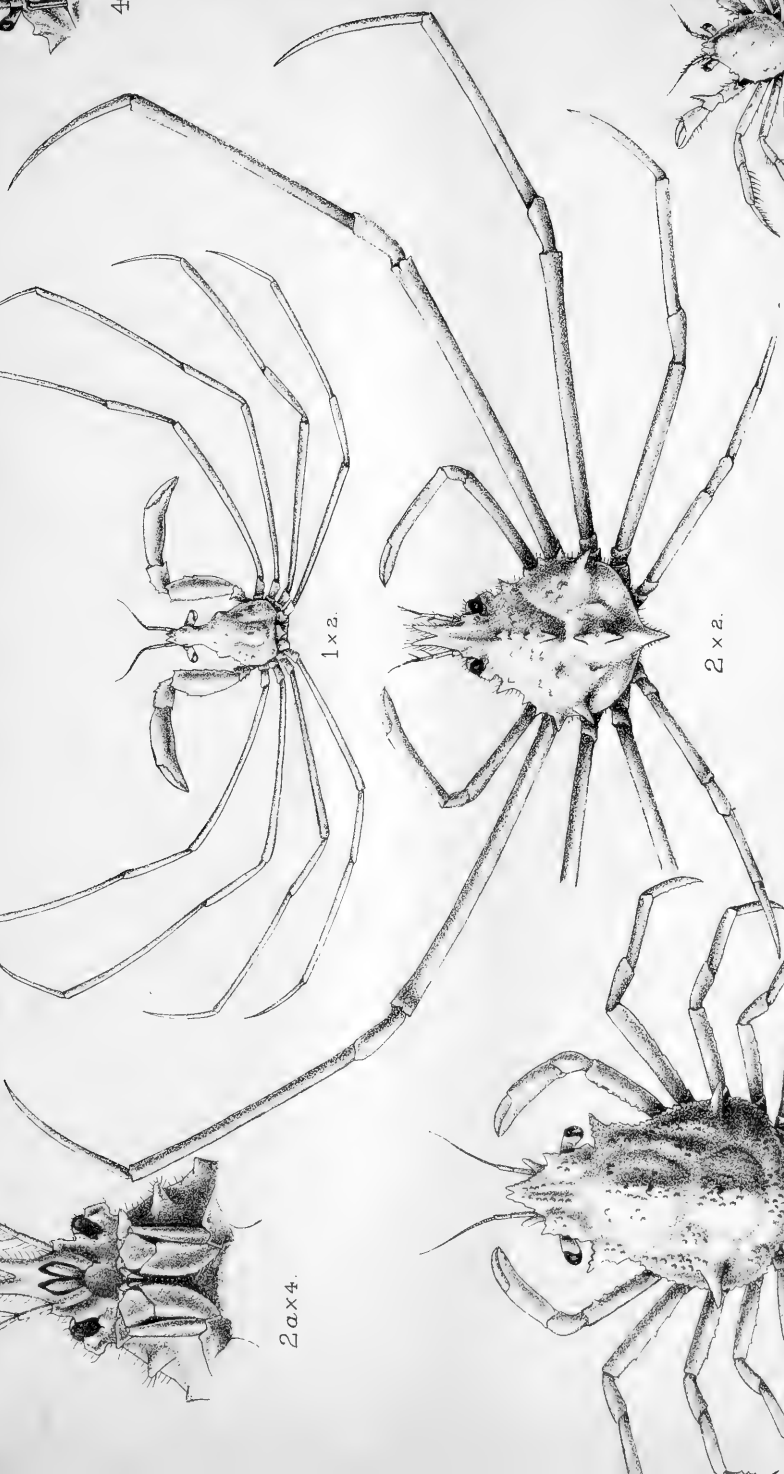




2a x 4.



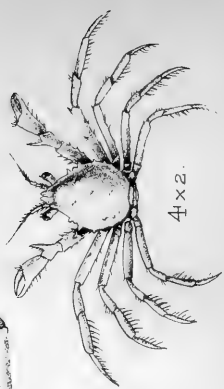
1 x 2.



2 x 2.



3 x 10.



4 x 2.



4a x 4.

1. *Achaeus cadelli*. 2. *Chorilibinia andamanica*.

3. *Collodes malabaricus*

4. *Paratymolus hastatus*.



MATERIALS

FOR A

CARCINOLOGICAL FAUNA OF INDIA.

No. 2.

THE BRACHYURA OXYSTOMA.

BY

A. ALCOCK, M.B., C.M.Z.S.,

SUPERINTENDENT OF THE INDIAN MUSEUM.

[*Reprinted from the "Journal Asiatic Society of Bengal,"*
Vol. LXV, Part II, No. 2, 1896.]

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1896.

From the Journal, Asiatic Society of Bengal, Vol. LXIV, Part II, No. 2, 1895.

Description of a New Species of Oxyrhynch Crab of the Genus Parthenope.

—By A. ALCOCK, M. B., C. M. Z. S., Superintendent of
the Indian Museum.

[Read 3rd July.]

The species here described is a true *Parthenope* as delimited by Miers, Journ. Linn. Soc., Zool., Vol. XIV. 1879, p. 668.

PARTHENOPE INVESTIGATORIS, n. sp.

Carapace almost equilaterally triangular, the sides very slightly curved: its surface is deeply eroded and rugose as in *P. horrida* and *spinosissima*, but is almost devoid of the sharp tubercles found in those species: the antero-lateral borders are slightly crenulate: the produced postero-lateral angle is rounded and nearly smooth: the posterior border bears five small eroded lobules — a very small one in the middle line, with two larger ones on either side — with intervening granules. The gastric region is enormously inflated as in *P. spinosissima*, and descends almost vertically to the vertically deflexed rostrum, the latter being fused with the interantennular tooth. The hepatic regions are rounded laterally, not strongly angulated as they are in *P. horrida* and *spinosissima*. The external maxillipeds, when closed, have the inner edges in the closest contact throughout.

The chelipeds have the *merus* very short and squat — its breadth about two-thirds of its length — with two compressed teeth on its short anterior (inner) border, a few blunt teeth followed by a blunt lobe on its posterior (outer) border, a strong tubercle in the middle of its upper surface, and numerous pearly tubercles and nodules on its lower surface: the *carpus* is granular and pustular: the *hand* has five sharp almost equal sized teeth on the lower border (two of them being on the immobile finger), several large nodules on the outer surface, and several large unequal sized spiny lobules on its inner surface: the *mobile finger* is spiny.

The ambulatory legs are compressed: the *merus* is compressed-trigonal, with the edges, especially the anterior edge, spiny: the *carpus* is indistinctly nodular: the *propodus* is also slightly nodular, with a few spinules on its posterior margin: the *dactylus* is closely covered with spinules up to its tip.

The sternum, in the female, is excavated between the chelipeds.

The abdominal terga, in the female, are raised into strong quadrangular convexities down the middle line, and on either side near the edge.

Loc.—Pedro Shoal, ? depth; and Laccadives, 28 fms.

Length of carapace of largest specimen (female) 45 millim., greatest breadth 61 millim.

The position of the above species in the *key to the Indian species of the genus Parthenope*, page 279 *ante* is thus shown :—

I. Carapace remarkably rugose (or spinose); chelipeds of the ordinary *Lambrus* form :—

1. Carapace somewhat pentagonal, not vertically deflexed from the front of the gastric region: abdominal terga of the female with a series of large eroded pits down either side

P. horrida.

2. Carapace somewhat equilaterally triangular, vertically deflexed from the front of the gastric region: abdominal terga of the female with a series of convexities or nodules down the middle line, and on either side—

i. Edges of carapace very strongly spinate: carpus of chelipeds and of ambulatory legs (like all the other parts of the body) strongly spinate: abdominal convexities of female spinate

P. spinosissima.

ii. Spinature very little developed: edges of carapace crenulate: carpus of chelipeds and of ambulatory legs granular or nodular: abdominal convexities of female not spinate

P. investigatoris.

II. The whole body and all the appendages beset with delicate paxilliform tubercles which unite to form a lace-work or frosting: chelipeds tapering, with long slender spiny fingers which are nearly as long as the palm

P. (Parthenomerus) efflorescens.

From the Journal, Asiatic Society of Bengal, Vol. LXV. Part II, No. 2, 1896.

Materials for a Carcinological Fauna of India. No. 2. The Brachyura Oxystoma.—By A. ALCOCK, M.B., C.M.Z.S., Superintendent of the Indian Museum.

Plates VI—VIII.

Received 7th May. Read 3rd June.

The limits of the Tribe of Oxystoma here adopted are those originally established by De Haan in the *Fauna Japonica*, and since recognized by Ortmann in his account of the Decapod Crustacea of the Strasburg Museum.

I can hardly, however, go as far as Ortmann in uniting the *Leucosiidæ* and *Raninidæ* in one section, *Leucosiinea*, co-ordinate in value with the *Dorippinea* and *Calappinea*. Rather, it seems to me, the affinities of the *Raninidæ* are, through *Cyclodorippe*, with the *Dorippidæ*. But on the whole it seems enough to recognize the *Raninidæ* as true Oxystomes of equal rank with the *Calappidæ*, *Leucosiidæ* and *Dorippidæ*, just as De Haan practically does.

No one who has examined any of the deep-sea Dorippoids can, I think, find any difficulty in accepting De Haan's comprehensive views of the relations of the Oxystoma.

For instance, in the Indian genus *Cymonomops** (which differs but little from *Cyclodorippe*), although the general external form is as plainly as possible that of *Dorippe*, yet a detailed examination shows a number of Raninoid characters:—The chelipeds are Raninoid, so are the external maxillipeds (especially in their long narrow merus and short narrow exognath), so are the antennules: the fact also that the afferent branchial openings are not in front of the bases of the chelipeds is suggestive. In *Cyclodorippe*, moreover, the oviducts open, as in the *Raninidæ*, on the bases of the third pair of legs.

We have, in fact, in some of these deep-sea forms the clearest evidence of the close relation of the *Ranina* type to the *Dorippe* type, and quite sufficient justification for accepting De Haan's scheme of the Oxystoma almost without modification.

The following is a list of the known Indian genera of Oxystomes:—

Calappidæ Calappinæ:—*Calappa*, *Mursia*, *Cryptosoma*.

Calappidæ Matutinæ:—*Matuta*.

Leucosiidæ Leucosiinæ:—*Actæomorpha*, *Oreophorus*, *Tlos*, *Heteronucia* (nov.), *Ebalia*, *Nursia*, *Nucia*, *Parilia*, *Randallia*, *Myra*, *Leucosia*, *Onychomorpha*, *Philyra*, *Pseudophilyra*.

Leucosiidæ Iliinæ:—*Myrodes*, *Iphiculus*, *Pariphiculus* (nov.), *Nursilia*, *Heterolithadia*, *Arcania*, *Ixa*.

Dorippidæ Dorippinæ:—*Dorippe*, *Ethusa*.

Dorippidæ Tymolinæ:—*Cymonomops*.

Raninidæ:—*Notopus*, *Raninoides*, *Lyreidus*, *C*.

Tribe OXYSTOMA or LEUCOSOIDEA.

Oxystomes, Milne-Edwards, Hist. Nat. Crust. II. 96 (partim), and *Raniniens* Milne-Edwards op. cit. II. 190.

OXYSTOMATA, DE HAAN, FAUN. JAPON. CRUST. pp. 111–119.

Leucosoidea vel *Oxystomata*, Dana, U. S. Expl. Exp. Crust. I. 389, and *Raninidea* vel *Anomura Leucosidica*, Dana, op. cit. pp. 400, 403.

Oxystomata or *Leucosiidea*, Miers, Challenger Brachyura, p. 337, and *Raninidea*, Henderson, Challenger Anomura, p. 26.

Oxystomata, Ortmann, Zool. Jahrbuch., Syst., VI. 1892, pp. 550, 551.

Epistome reduced or absent. The efferent branchial channels terminate in the middle of the buccal area, the buccal cavern is therefore produced forwards and is generally of an elongate triangular shape; and the efferent channels themselves, whether covered by the external maxillipeds or not, are immediately closed in by an elongate lamellar process of the exopodites of the first maxillipeds.

* Illustrations of the Zoology of the 'Investigator,' Crustacea pl. xiv. fig. 9.

The afferent branchial openings are found either in the usual place in front of the bases of the chelipeds, or at the sides of the endostome.

Branchiæ from six to nine on either side.

The antennules fold either longitudinally or obliquely, very rarely transversely.

In the male the genital ducts protrude either through the bases of the fifth pair of legs or through the fifth thoracic sternum close by.

The Oxystoma may be divided into four families as follows:—

Family I. *Calappidæ*. Carapace of the ordinary brachyurous shape. The afferent branchial openings are found in front of the bases of the chelipeds. The antennæ are small. The legs are normal in position. The vasa deferentia perforate the bases of the fifth pair of legs. The branchiæ are nine in number on either side. The external maxillipeds either completely cover the buccal cavern and have their palp hidden in repose (*Matutinæ*), or do not close the buccal cavern and have their palp always exposed (*Calappinæ*).

Family II. *Leucosiidæ*. The carapace is of the ordinary brachyurous shape. The afferent branchial channels are found on either side of the endostome. The vasa deferentia perforate the sternum near the bases of the fifth pair of legs. The legs are normal in position. The antennæ are small, sometimes obsolete. The external maxillipeds completely close the buccal cavern and have the palp completely hidden in repose. The branchiæ are less than nine (six in many forms) in number on either side.

Family III. *Dorippidæ*. The carapace is short, so that the first two or three abdominal terga, instead of being tucked up beneath it, are completely exposed in the dorsal plane of the body. The last two pairs of legs are much reduced in size and have a peculiar position in the dorsal plane of the body. The antennæ are large. The antennules are usually too large to fold into their fossettes. The vasa deferentia emerge through the sternum near the bases of the fifth pair of legs. The afferent branchial openings are found either in front of the bases of the chelipeds or not. The external maxillipeds either do cover the buccal frame (*Tymolinæ*), or do not (*Dorippinæ*). The branchiæ are less than nine in number on either side.

Family IV. *Raninidæ*. Carapace remarkably elongate, but not covering the abdominal terga, the first 4 or 5 of which lie exposed in the dorsal plane of the body. The last pair of legs also is raised in the dorsal plane of the body. The antennæ are large. The antennules also are large, and do not fold into fossettes. The vasa deferentia protrude through the bases of the fifth pair of legs: *the oviducts pierce the bases*

of the third pair of legs. The sternum is broad anteriorly, very narrow or linear posteriorly. The afferent branchial openings are not found in front of the bases of the chelipeds, and afferent currents probably reach the branchial chamber between the posterior border of the carapace and the bases of the last pair of legs. The external maxillipeds completely cover the buccal cavern, and their palp is concealed in repose: their exopodite is but little longer than the ischium. The branchiæ are less than nine in number on either side.

Family CALAPPIDÆ.

Calappiens, Milne-Edwards, Hist. Nat. Crust. II. 100.

Calappidea and *Matutoidea*, De Haan, Faun. Japon. Crust. pp. 124, 126.

Calappidæ and *Matutidæ*, Dana, U. S. Expl. Exp., Crust. I. pp. 390, 391.

Calappidæ and *Matutidæ*, Miers, 'Challenger' Brachyura, pp. 282, 293.

Carapace more or less oval or subcircular, commonly with either (1) a single denticle or a heavy spine at the junction of the antero-lateral and postero-lateral borders, or (2) a postero-lateral vault-like expansion over the ambulatory legs (*Calappa*). Front generally about as wide as the orbit. The antennules generally fold obliquely. The antennæ are generally small.

The external maxillipeds may (*Matutinæ*) or may not (*Calappinæ*) completely close the buccal cavern, and their palp may (*Matutinæ*) or may not (*Calappinæ*) be concealed in repose.

The efferent branchial channels together form a deep channel in the endostome the channel being covered in below by a long lamellar process of the internal (first) maxillipeds. The afferent branchial openings have the normal position in front of the bases of the chelipeds.

The chelipeds are ponderous and greatly enlarged, and are practically symmetrical (except sometimes as to the fingers)*: the hands especially are of great size—forming often the most conspicuous part of the chelipeds, and are so curved as to shut closely against the pterygostomian regions of the carapace, thus acting as a sort of buckler.

The abdomen usually (always in Indian forms) consists in the adult male of 5 segments, the 3rd–5th terga being fused together, and of 7 separate segments in the female (and young male). The branchiæ in all Indian forms are nine in number on either side.

In the male the vasa deferentia perforate the bases of the fifth pair of legs.

In the following list of genera belonging to the family *Calappidæ*

* In the exotic genus *Platymera* one cheliped is larger than the other.

those belonging to the Indian fauna are printed in Roman type, and those known to me by autopsy are marked with an asterisk.

Family **Calappidæ**.

Subfamily I. *Calappinæ*.

Alliance I. CALAPPOIDA.

* *Calappa*.

Paracyclois, Miers, 'Challenger' Brachyura, p. 288, pl. xxiv. figs. 1, 1a-1c.

* *Platymera*, Milne-Edwards, Hist. Nat. Crust. II. 107; and Milne-Edwards and Lucas, Voy. Amer. Merid. Crust. pl. xiii.

* *Mursia*.

Acanthocarpus, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 152; and A. Milne-Edwards, Bull. Mus. Comp. Zool. VIII. 1880-81, pl. i.

* *Cryptosoma*.

Alliance II. ORITHYIOIDA.

Orithyia, Fabr., Milne-Edwards, Hist. Nat. Crust. II. 110, and in Cuvier, Règne Animal, Crust., pl. viii. figs. 1, 1a-1c.

Subfamily II. *Matutinæ*.

Alliance I. MATUTOIDA.

* *Matuta*.

Alliance II. HEPATOIDA.

Osachila, Stimpson, Bull. Mus. Comp. Zool., II. 1870-71, p. 154; and Faxon, 'Albatross' Stalk-eyed Crustacea, pl. v. figs. 2, 2a, 2b.

* *Hepatus*, Latr., Milne-Edwards, Hist. Nat. Crust. II. 116, and in Cuvier Règne Animal, Crust. pl. xiii. figs. 2, 2a-i.

Subfamily CALAPPINÆ.

Calappidæ, Dana loc. cit., and Miers loc. cit.

Merus of external maxillipeds not elongate and acute (except in the exotic and somewhat aberrant genus *Orithyia*), and never concealing the palp in repose. Legs gressorial (except in the exotic genus *Orithyia*.)

Subfamily MATUTINÆ.

Matutidæ, Dana, *loc. cit.*, and Miers, *loc. cit.*

Merus of external maxillipeds elongate and acute, entirely concealing the palp in repose. Legs natatorial.

Key to the Indian genera of Calappidæ.

- I. *Calappinæ* :—Merus of external maxillipeds not elongate or acute, and never concealing the flagellum in repose: ambulatory legs gressorial:—
 1. Carapace with a postero-lateral shield-like expansion or series of broad serrations, forming a vault beneath which the four ambulatory legs can be completely or largely concealed in flexion: basal joint of antennæ much dilated CALAPPA.
 2. Carapace without any trace of a postero-lateral shield-like expansion: basal joint of antennæ slender:—
 - i. Carapace transversely oval, with a large spine at the junction of the antero-lateral and postero-lateral borders ... MURSIA.
 - ii. Carapace sub-circular or longitudinally suboval, with a small denticle at the junction of the antero-lateral and postero-lateral borders CRYPTOSOMA.
- II. *Matutinæ* :—Merus of external maxillipeds elongate and acute, and completely concealing the flagellum in repose: ambulatory legs in the form of swimming paddles. (Carapace sub-circular, with a large spine at the junction of the antero-lateral and postero-lateral borders: antennæ rudimentary) MATUTA.

CALAPPA, Fabricius, Edw.

Calappa, Fabricius, Ent. Syst., Suppl. p. 345.

Calappa, Milne-Edwards, Hist. Nat. Crust. II. 102.

Calappa, Lophos, Camara, Gallus, De Haan, Fauna Japonica, Crust. pp. 69, 70, 125.

Calappa, Miers, 'Challenger' Brachyura, p. 283.

Carapace strongly convex, rounded in front, much broadened behind by a pair of clypeiform expansions, or wings, beneath which the four pairs of ambulatory legs are concealed in flexion.

Front small, somewhat triangular, projecting little or not at all beyond the level of the orbits, bilobed.

Orbits small, circular: eyestalks short and thick.

The antennules fold nearly vertically beneath the front.

The basal joint of the antennæ is very broad, and fills a wide hiatus at the inner angle of the orbit: the flagellum is short usually.

There is no distinct epistome; but the endostome is prolonged, as far as the antennular fossæ, in the form of a canal, which is divided longitudinally by a deep vertical septum into two channels, each channel being completed below by a lamellar process from the first pair of maxillipeds.

The external maxillipeds do not meet across the mouth, but leave exposed between them the mandibles, and, in front of them, the aforementioned plate-like prolongations from the first pair of maxillipeds.

The chelipeds are very large, and in flexion are closely apposed to the front half of the carapace, so as to form a sort of buckler: the meropodite, or "arm," has near its distal end, externally, a transverse wing-like expansion, complementary to the wing-like expansions of the carapace: the propodite, or "hand," is strongly compressed, its upper border forming a high, sharply dentate or crenulate, crest. Except for the fingers, the chelipeds are equal and symmetrical; both the fingers, namely, of one hand have on their outer aspect, near the base, a stout projecting lobule.

The abdomen in the adult male* consists of only five separate pieces, owing to the fusion of the 3rd, 4th and 5th somites. In the young male, as in the adult female, it consists of seven separate somites.

Key to the Indian species of Calappa.

- I. Extreme length of the carapace either quite or nearly equal to its extreme breadth:—
 1. Carapace as long as broad: clypeiform expansions ill developed:—
 - i. Carapace sub-circular, with 7 longitudinal parallel lines of bullous tubercles ... *C. pustulosa*.
 - ii. Carapace sub-quadragular, without regular lines of tubercles ... *C. wood-masoni*.
 2. Carapace a little broader than long: clypeiform expansions well-developed ... *C. gallus*.

* ? *C. gallus*, of which species I have not seen adult males.

- II. Extreme length of the carapace about two-thirds of its extreme breadth: free margin of clypeiform expansions strongly lacinate:—
1. Carapace, in the adult, nearly smooth: clypeiform expansions well-developed.
[*Inhabitants of shallow water*]:—
 - i. Anterior border of endostomial septum deeply concave: no spine in the middle line, on the posterior border *C. lophos.*
 - ii. Anterior border of endostomial septum strongly convex: a spine in the middle line, on the posterior border *C. philargius.*
 2. Carapace, in the adult, more or less covered with pustular tubercles: clypeiform expansions little developed.
[*Habitat deep water*] *C. exanthematos.*
- III. Extreme length of the carapace very much less than two-thirds of its extreme breadth: free margin of clypeiform expansions either smooth throughout, or broadly dentate:—
1. Extreme length of carapace rather more than half its extreme breadth: surface of carapace with numerous sharpish tubercles: antero-lateral border of clypeiform expansions with broad teeth the points of which are either acute or have the form of up-curved spines:—
 - i. Antero-lateral border of carapace coarsely serrate *C. hepatica.*
 - ii. Antero-lateral border of carapace, and of clypeiform expansions, with strongly up-curved spines *C. spinosissima.*
 2. Extreme length of carapace rather less than half its extreme breadth: surface of carapace with wavy beaded lines only: free edge of clypeiform expansions smoothly moulded and entire *C. fornicata.*

1. *Calappa fornicata*, Fabr.

Cancer calappoides, Rumph, Amboinsche Rariteitkamer I. 21, pl. xi. figs. 2, 3.

Cancer heracleoticus, Seba, Thesaurus III. 51, pl. xx. figs. 7, 8.

Cancer calappa, Linn., Mus. Lud. Ulr. p. 449, and Syst. Nat., 12th ed. I. ii. 1048 : Herbst, Krabben I. ii. 196, pl. xii. figs. 73, 74 : Fabricius, Ent. Syst. II. 454.

Calappa fornicata, Fabricius, Ent. Syst. Suppl. p. 345 : Bosc, Hist. Nat. Crust. I. 183 (nec pl. iii. fig. 3) : Latreille, Hist. Nat. Crust. et. Ins. V. 394 : Desmarest, Consid. Gen. Crust. p. 109 : MILNE-EDWARDS, Hist. Nat. Crust., II. 106 : Dana, U. S. Expl. Exped., Crust. pt. I. p. 394, pl. xxv. fig. 1 : A. Milne-Edwards, Nouv. Archiv. du Mus. IV. 1868, p. 72, and X. 1874, p. 56 : Hilgendorf in Von Der Decken's Reisen in Ost.-Afr. III. i. p. 92 : Brito Capello, Jorn. Sci. Lisboa, III. 1870-71, p. 133, pl. ii. fig. 5 : E. Nauck, Zeits. Wiss. Zool. xxxiv. 1880, p. 46 (gastric teeth) : A. Ortmann, Zool. Jahrbucher, Syst. etc. VI. 1892, p. 569.

Carapace in length less than half the extreme breadth ; its surface nearly smooth anteriorly, marked with transverse wavy beaded lines posteriorly ; its antero-lateral borders crenulated.

Clypeiform expansions very large, their breadth (transverse measurement) equal to their length (oblique antero-posterior measurement) ; their edge smoothly moulded, and in unbroken continuity with the smoothly moulded posterior border of the carapace. Outer part of the pterygostomian regions densely hairy.

Front slightly projecting beyond the level of the orbits, bilobed, its breadth at the tip rather less than the breadth of the orbit.

Endostomial septum extending vertically from the level of the front to the level of the mouth ; its anterior border strongly convex and projecting.

Transverse wing-like expansion near the distal end of the arm with its edge smooth and entire.

Outer surface of palm with squamiform tubercles and transverse wavy beaded ridges : upper margin, or crest, of palm bluntly dentate.

Three specimens, including a male and ovigerous female of remarkable size, are in the Museum collection, from the Andamans.

The eggs are singularly minute.

2. *Calappa hepatica* (Linn.)

Cancer hepaticus, Linn., Mus. Lud. Ulr., p. 448, and Syst. Nat. ed. xii. I. ii. 1048.

Calappa hepatica, De Haan, Faun. Japon. Crust., p. 70 : Miers, Cat. Crust. New Zealand, p. 55, and Phil. Trans. Roy Soc. Vol. 168, 1879, p. 491, and Zoology H. M. S. 'Alert' pp. 185, 257, 518, 550, and 'Challenger' Brachyura, p. 285 : Haswell, Cat. Austral. Crust., p. 136 : Filhol, Crust. Nouvelle Zélande, p. 406 : [Cano, Boll. Soc. Nat. Napoli, III. 1889, p. 249] : A. Ortmann, Zool. Jahrbuch., Syst. etc., VI. 1892, p. 568 : J. R. Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 395.

Cancer tuberculatus, Herbst, Krabben, I. ii. 204, pl. xiii. fig. 78 : Fabricius, Ent. Syst. II. 454.

Calappa tuberculata, Fabricius, Ent. Syst., Suppl., p. 345 : Bosc, Hist. Nat. Crust. I. 183 : Latreille, Hist. Nat. Crust. et. Ins., V. 393 : Desmarest, Consid. Gen. Crust., p. 109, pl. 10, fig. 1 : MILNE-EDWARDS, Hist. Nat. Crust., II. 106 : Owen, Zool. Beechey's Voy. "Blossom," Crust. p. 80 : Krauss, Südafr. Crust., p. 52 : Dana, U. S. Expl. Exp., Crust. pt. I. p. 393 : Stimpson, Proc. Ac. Nat. Sci. Philad., 1853, p. 162 : Heller, Crust. Roth. Meer. in SB. Ak. Wien, 1861, XLIII. p. 372, and 'Novara' Crust. p. 69 : Hess, Archiv. fur Naturges. XXXI. 1865, pp. 157 and 172 : E. Martens, Verh. zool.-bot. Ges. Wien, XVI. 1866, p. 381 : A. Milne-Edwards, Nouv. Archiv. du Mus. IV. 1868, p. 72, and X. 1874, p. 55 : Hilgendorf in Von Der Decken's Reisen in Ost.-Afr. III. i. 92 : Brito Capello, Jorn. Sci. Nat. Lisboa, III. 1870-71, p. 133, pl. ii. fig. 8 : Hoffman in Pollen and Van Dam, Faun. Madagasc. V. 2. 1874, Crustacea, p. 25 (part), pl. vi. figs. 39, 41, 42 : Brocchi, Ann. Sci. Nat. (6) II. 1875, Art. 2, p. 101, pl. xviii. figs. 160, 161, (male appendages) : Kossmann, Reise Roth. Meer., Crust., p. 63 : Streets, Bull. U. S. Nat. Mus. VII. 1877, p. 116 : Hilgendorf, MB. Ak. Berl. 1878, p. 809 : Richters, in Möbius, Meeresf. Maurit. p. 157 : de Man, Notes Leyden Mus. II. 1880, p. 184, and Archiv. fur Naturges. LIII. i. 1887, p. 388 : E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 46 (gastric teeth) : Lenz and Richters, Abh. Senck. Ges. XII. 1881, p. 425 : Muller, Verh. Ges. Basel VIII. 1886, p. 473.

Calappa tuberculosa, Guérin Méneville, Icon. R. A., Crust. pl. 12, figs. 2, 2a, 2b.

Calappa sandwichien (*Calappa tuberculata* var.) Eydoux and Souleyet Voy. 'Bonite,' Vol. I., Zool., p. 245, pl. iii., figs. 9, 10.

Length of carapace a little more than half the extreme breadth. In the anterior two-thirds the surface of the carapace is tuberculate and granular, in the posterior third it is marked with squamiform tubercles and beaded ridges : the antero-lateral borders are coarsely dentate or serrate.

Clypeiform expansions greatly developed, their breadth being equal to their length : their anterior border shows the points of four teeth, but the postero-lateral border forms a continuous curve, broken only on the under surface by three or four faint sutures.

Posterior border of the carapace beaded, unarmed.

Outer part of the pterygostomial regions densely hairy.

Front emarginate, not projecting beyond the level of the orbits, its breadth at the tip markedly less than the breadth of the orbit.

The endostomial septum extends vertically from the level of the front to the level of the mouth ; its anterior border strongly convex and projecting.

Transverse wing-like expansion of the distal end of the arm with its edge four-lobed. Outer surface of palm with numerous sharp tubercles : upper surface of wrist tuberculate : anterior end of arm with some sharp granules : crest of palm crenulate, not sharply dentate.

Andamans, Nicobars, Maldives, Laccadives, Persian Gulf.

In the very young, the extreme length of the carapace is not much

less than three-fourths of the extreme breadth, owing not only to less development of the clypeiform expansions, but to the relative less breadth of the body.

3. *Calappa spinosissima*, Edw.

Calappa spinosissima, Milne Edwards, Hist. Nat. Crust. II. 106: A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 55: Richters, in Möbius Meeresf. Mauritz, p. 157.

Calappa tuberculata (part) Hoffmann in Pollen and Van Dam, Faun. Madagasc. V. ii. Crustacea, p. 25, pl. vi. figs. 40, 43, 44.

Differs from *C. hepatica* only in the following characters:—

(1) the serrations on the antero-lateral border of the carapace, as also the teeth on the antero-lateral border of the clypeiform expansions, are in the form of sharp up-curved spines:

(2) the postero-lateral border of either clypeiform expansion has three spines where, in *C. hepatica*, there are only sutures on the under surface:

(3) some of the tubercles on the outer surface of the palm have sharp spinous points.

From a single small specimen, which is all that the Indian Museum at present possesses, it is impossible to express any opinion as to whether this species is, as Hoffmann appears to have regarded it, a variety of *C. hepatica*, or not.

4. *Calappa lophos*, (Herbst).

Cancer lophos, Herbst, Krabben, I. ii. 201, pl. xiii. fig. 77.

Calappa lophos, Fabricius, Ent. Syst. Suppl., p. 346: Bosc, Hist. Nat. Crust. I. 184: Latreille, Hist. Nat. Crust. et Ins. V. 394: Milne Edwards, Hist. Nat. Crust. II. 104: De Haan, Faun. Japon. Crust. p. 72, pl. xx. fig. 1: Heller, 'Novara' Crust. p. 69: Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 315, and 'Challenger' Brachyura, p. 286: E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 46, (*gastric teeth*): de Man, Archiv. für Naturges. LIII. 1887, i. p. 389: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 395.

? *Calappa guerini*, Brito-Capello, Jorn. Sci. Nat. Lisb. III. 1870-71, pp. 128, 133 pl. ii. fig. 2.

The length of the carapace is not quite two-thirds the extreme breadth.

Carapace smooth, except for a few lumps anteriorly and a few scattered granules posteriorly: its antero-lateral borders beaded and finely festooned: its posterior border beaded, and bounded on either side by a tooth.

Clypeiform expansions nearly as broad (transverse measurement) as long (oblique antero-posterior measurement), and formed of about 6 large lacinated teeth.

Outer part of the pterygostomial regions densely hairy.

Front bifid, its least breadth equal to the breadth of the orbit, beyond the level of which it does not project.

Endostomial septum extending, posteriorly, from the level of the front to the level of the mouth, but deeply excised anteriorly.

Margin of the transverse wing-like expansion of the distal end of the arm four-lobed, the two anterior lobes each with a spine: upper surface of wrist and outer surface of palm nearly smooth: crest of palm deeply 6- or 7-toothed.

Andamans; the whole of the east coast of India, from the Ganges Delta to Pondicherry; Ceylon, Persian Gulf.

In the *young* the carapace is traversed longitudinally in its anterior three-fourths, by 7 or 8 lines of sharpish tubercles, and is marked in its posterior third by a pair of large ocelli, one in each epibranchial region.

From an examination of a very large series of these young I feel nearly sure that Capello's *C. guerini* is to be referred to this species.

5. *Calappa philargius* (L.)

Cancer philargius, Linn. Mus. Lud. Ulr. p. 432, and Syst. Nat. ed. xii. I. ii. 1042: Herbst, Krabben, I. ii. 203.

Cancer inconspicuous, Herbst, Krabben, II. ii. 162, pl. xl. fig. 3.

Calappa cristata, Fabricius, Ent. Syst. Suppl. p. 346: Latreille, Hist. Nat. Crust. et Ins. V. 393: MILNE-EDWARDS, HIST. NAT. CRUST. II. 105, pl. xx. figs. 1, 2: Stimpson, Proc. Ac. Nat. Sci. Philad., 1858, p. 62: Ortmann, Zool. Jahrb., Syst. etc., VI., 1892, p. 565.

Calappa inconspicua, Bosc, Hist. Nat. Crust. I. 185.

Calappa philargius, De Haan, Faun. Japon. Crust. p. 71, pl. xix. fig. 1: E. Nauck, Zeits. Wiss. Zool., XXXIV. 1880, p. 46 (*gastric teeth*): de Man, Archiv. fur Natarges., LIII. 1887, i. p. 388, and Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 196: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 396.

The extreme length of the carapace is two-thirds the extreme breadth.

Differs from *C. lophos* only in the following characters:—

(1) there is a large tooth in the middle of the posterior border, and the tooth bounding that border on either side is more salient:

(2) the endostomial septum, instead of being deeply excised anteriorly, has its anterior border strongly convex and projecting.

Mergui, Andamans, Ceylon, Persian Gulf.

In the *young* the teeth of the posterior and postero-lateral borders are more prominent and less oblique; and the carapace is traversed fore and aft by 7 or 8 rows of sharp tubercles.

6. *Calappa exanthematos*, Alcock and Anderson.

Calappa exanthematos, Alcock and Anderson, Journal Asiatic Soc. Bengal, Vol. LXIII. pt. 2, 1894, p. 177, and Illustrations of the Zoology of the R. I. M. S. 'Investigator,' Crustacea, pl. xv. figs., 1, 1a.

Extreme length of carapace a little more than two-thirds the extreme breadth.

The carapace is greatly inflated, especially in the branchial regions : its surface in rather more than its anterior half is covered with large round, or oval, smooth mamillary tubercles having a red base and a shining yellow apex, and exactly resembling smallpox pustules ; and is covered posteriorly with smaller round, or oval, slightly elevated patches, which exactly resemble smallpox papules. The antero-lateral borders of the carapace are quite smooth in their anterior half, and have 4 or 5 coarse serrations in their posterior half : the posterior border is beaded, and is bounded on either side by a tooth.

The clypeiform expansions are little developed, their extreme transverse dimension being less than one-third their extreme dimension in an inwardly oblique antero-posterior direction : they consist of about seven serrated teeth.

The pterygostomian regions have only a few scanty hairs.

The front is bifid, the breadth of its tip is half again that of the orbit, beyond which it does not project.

The flagellum of the antenna is nearly twice the breadth of the orbit in length.

The endostomial septum is narrow, not extending vertically to the level of the mouth, and quite plainly shows its origin out of a fold of the endostome : its anterior border is cut straight, and projects obliquely.

The wing-like expansion at the end of the arm has its edge finely serrate and 4-dentate. The upper surface of the wrist and the outer surface of the palm are more or less covered with pustules similar to those on the carapace. The palm has its crest sharply 6- or 7-dentate and its lower surface uniformly covered with beadlike granules.

The sterna corresponding to the 2nd, 3rd and 4th pairs of legs are much inflated.

Bay of Bengal, off the Madras coast, 91-112 fms.

In the *young* the tubercles on the carapace are sharper, and extend further backwards.

7. *Calappa gallus*, (Herbst.)

Cancer gallus, Herbst, Krabben, III. iii. 46, pl. lviii. fig. 1.

Calappa gallus, Milne Edwards, Hist. Nat. Crust. II. 105 : De Haan, Faun. 151

Japon. Crust. p. 70 : Dana, U. S. Expl. Exp. Crust. pt. I. p. 393 : A. Milne Edwards in Maillard's l'île Réunion, Annexe F. p. 10, and Nouv. Archiv. du Mus. X. 1874, p. 55 : Brito Capello, Journ. Sci. Nat. Lisb. III. 1870-71, p. 133, pl. ii. fig. 4 : F. Müller, Verh. Ges. Basel, VIII. 1886, p. 473 : Miers, 'Challenger' Brachyura, p. 286 : Ozorio, Journ. Sci. Nat. Lisb., XI. 1885-87, p. 227 : de Man, Arch. fur Naturges., LIII. 1887, i. p. 388, and Journ. Linn. Soc., Zool. XXII. 1888, p. 197 : Ortmann, Zool. Jahrbuch., Syst., &c., VI. 1892, p. 567 : J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 395.

The extreme length of the carapace is nearly five-sixths the extreme breadth.

The carapace, the outer surface of the wing-like expansion of the arm, the upper surface of the wrist, and the outer surface of the palm, are covered with coarse tubercles, which become squamiform on the posterior part of the carapace.

The antero-lateral border of the carapace is crenulate, and the posterior border is finely beaded and quite unarmed.

The clypeiform expansions are well developed, their extreme transverse dimension being about two-thirds their extreme antero-posterior dimension: the free edge of each has about six strong teeth with beaded edges

The pterygostomian regions have only a few scanty hairs.

The front is emarginate, and projects well beyond the orbits, forming a laminar rostrum.

The endostomial septum extends vertically from the level of the front to the level of the mouth: its anterior border is angularly convex.

The wing-like expansion of the end of the arm is conspicuously four-lobed: the crest of the palm is 6- or 7-dentate.

Mergui, Andamans, Ceylon, Persian Gulf.

In the *young* the tubercles of the carapace and chelipeds are sharper and crisper, and the antero-lateral borders of the carapace are sharply serrate.

8. *Calappa pustulosa*, n. sp. Plate VI. fig. 1.

Carapace subcircular, the clypeiform expansions consisting of five short broad teeth, the last of which is in advance of the level of the posterior border: its surface is covered with large bullous tubercles arranged in seven parallel longitudinal rows: the antero-lateral borders are smooth in their anterior half, crenulated in their posterior half: the posterior border is bounded on either side by a faint prominence.

The pterygostomian regions have a few scanty hairs.

The front is sharply bilobed, its tip is not quite so broad as the orbit, beyond the level of which it projects.

The endostomial septum does not extend vertically from the level of the front to the level of the mouth, except at its posterior limit.

The crest at the distal end of the arm is four-lobed: the upper surface of the wrist and the outer surface of the palm have numerous bullous tubercles like those on the carapace: the crest of the palm is serrate.

The abdomen is as in *C. lophos*.

The sterna corresponding to the 2nd, 3rd and 4th legs are inflated.

Off Ganjam and Orissa Coasts, 25 fathoms.

9. *Calappa wood-masoni*, n. sp. Plate VI. fig. 2. = *C. bicornis*?

Very closely allied to *C. depressa*, Miers, 'Challenger' Brachyura, p. 287, pl. xxiii. fig. 2.

The extreme length of the carapace is a little greater than the extreme breadth.

Carapace depressed; its surface crisply tuberculate, except between the eyes, the tubercles becoming squamiform posteriorly: the antero-lateral borders crisply crenulate, the posterior border entire and unarmed.

The clypeiform expansions are slightly developed, and plainly consist of about 7 convex carinate teeth fused together except at the tip.

Pterygostomial region with few scanty hairs.

Rostrum sharply and deeply bilobed, each lobe being again subdivided at tip; projecting well beyond the level of the orbits, and rather broader than them.

Flagellum of antenna nearly half the length of the carapace.

Endostomial septum extending vertically from the level of the front to the level of the mouth; its free edge greatly thickened, its anterior edge sharply excised.

Crest at the distal end of the arm broadly and faintly four-partite: upper surface of wrist and outer surface of palm crisply tuberculate: crest of palm sharply serrate.

Penultimate segment of the male abdomen the shortest of all except the first.

Off south coast of Ceylon, 34 fathoms.

The above description applies to the *young*, no adults having been obtained.

MURSIA, Desmarest, Edw.

Mursia, Desmarest, Consid. Gen. Crust., p. 108, pl. 9, fig. 3.

Mursia, [Latreille, in Cuvier, Règne Animal, ed. 2, p. 39] and Milne-Edwards in Cuvier, Règne Animal, ed. 3, p. 54.

Mursia, Milne-Edwards, Hist. Nat. Crust. II. 109.

Mursia, De Haan, Faun. Japon. Crust. p. 68 and p. 125.

Mursia, Miers, Challenger Brachyura, p. 290, (*ubi synon.*).

Thealia, Lucas, Ann. Soc. Entomol. France (1) VIII. 1839, p. 577.

Carapace oval, moderately convex, rounded in front, rather suddenly contracted behind, the evenly-arched antero-lateral margins ending in a large lateral epibranchial spine.

Front with a small acuminate tip.

Orbits rather large, oval, with at least one closed but distinct fissure in the upper margin, and with two wide gaps in the lower margin, in one of which the basal joint of the antenna is lodged. Eyes large, eyestalks short and thick.

The antennules fold obliquely. The basal joint of the antennæ is not dilated.

There is no distinct epistome, but, as in *Calappa*, the endostome is prolonged into a canal, which however is but incompletely divided longitudinally, the septum being little more than a ridge anteriorly, though well developed posteriorly. As in *Calappa* the first pair of maxillipeds give off each a lamellar process to complete this efferent canal below.

The external maxillipeds do not meet across the mouth, but, as in *Calappa*, leave exposed between them the mandibles, and, in front, the plate like prolongations of the first maxillipeds.

The chelipeds are enlarged, much as in *Calappa*; but the meropodite, or "arm," instead of a transverse crest near the distal end of its outer surface, has merely a ridge with one or two spines: the palm is compressed and its upper border forms a dentate crest, but not such a high one as that of *Calappa*. As in *Calappa* the chelipeds are only asymmetrical as regards the fingers, which on one hand have on their outer aspect, near the base, a stout lobule.* The legs are large, the first two pairs being at least as long as the chelipeds.

The abdomen in the male is as broad in the proximal half as it is in the female: in the adult male it consists of five segments, the 3rd, 4th and 5th being intimately fused, the sutures even being hardly distinguishable: in both sexes the tergum of the 1st somite is almost entirely concealed, and that of the 2nd somite strongly carinate transversely.

Mursia is practically *Calappa* without the wings to the carapace, and with large strong legs: the widely fissured orbital floor, the less

* In *Mursia hawaiiensis*, Mary J. Rathbun, Proc. United States National Museum, xvi. 1893, p. 252, the chelipeds are described as very unequal.

pronounced endostomial septum, and the slender basal-antennary joint are the other important points of difference.

10. *Mursia bicristimana*, Alcock and Anderson.

Mursia bicristimana, Alcock and Anderson, Journ. Asiatic Soc. Bengal, Vol. LXIII. 1894, pt. 2, p. 179; and Ill. Zool. 'Investigator' Crust. pl. xxiv. fig. 5 (in the press).

The length of the carapace is about seven-ninths of the breadth immediately in front of the lateral epibranchial spine; and the length of the epibranchial spine is from one-third (in the young) to less than one-fourth (in the adult) the length of the carapace.

The surface of the carapace is closely granular, and in addition there are *seven rows of tubercles*, one in the middle line, and three on each side radiating over the branchial regions: the antero-lateral margins are finely beaded and evenly and sharply festooned: the postero-lateral margins are without the angular bend inwards seen in *M. armata*: *the posterior margin is bounded on either side by a laminar denticle, not by a great projecting lobule as in M. armata.*

The outer parts of the pterygostomial and subhepatic regions are covered with a dense felt of long hairs.

The rostrum is trilobed, its breadth at the level of the lobes being about one half more than the greatest breadth of the orbit.

The transverse ridge near the distal end of the arm is very hairy, and is armed distally with two spines, the outer and larger of which is more than half the length of the lateral epibranchial spine. *This ridge is continued along the palm as a sharp longitudinal crest* (more prominent even than that of *Platymera*) which is unevenly trilobed, the proximal lobe being spiniform, the middle lobe broad and obtuse, and the distal lobe narrow and obtuse. The upper surface of the wrist, and the outer surface of the palm and fingers, are closely and sharply granular: the upper edge, or crest, of the palm is 7- serrate.

The ambulatory legs are large stout and compressed, those of the first three pairs being a little longer than the chelipeds. In these three pairs the *meropodite is lamellar, its greatest breadth being considerably more than a third its length*; the carpus has its outer surface traversed longitudinally by three beaded carinæ, the middle one of which ends in a spine; and the propodite is lamellar with the outer (anterior) edge subcarinate and the upper surface traversed longitudinally by two or three raised lines of fine beading.

The second abdominal tergum in both sexes is raised into a stout carina, the height of which is more than a third the transverse diameter of the tergum: this carina is three lobed, the lobes being separated only

by fissures. In the female, as in the male, the 3rd-5th terga are fused, although the lines of fusion are quite distinct in the former sex.

Colours in life salmon pink.

Off Ceylon, 142-400 fms., and 180-217 fms.

In the form of the legs, in the ornamentation of the chelipeds, and in the shape of the carapace, this species bears a strong resemblance to *Platymera*. Even in the articulation of the flagellum with the merus of the external maxillipeds the appearances are somewhat those of *Platymera*.

On the other hand the form of the endostomial channels, and of the processes of the first maxillipeds which close those channels ventrally, as well as the practical symmetry of the chelipeds, are all as in *Mursia*.

But a comparison of this species with specimens of *Mursia armata* and *Platymera gaudichaudii* leads to the belief that all three are congeneric.

The dimensions of an adult male are as follows :—

breadth of carapace 67 millim., excluding the lateral epibranchial spines ;
length of carapace 47 millim.

length of first pair of ambulatory legs about 90 millim.

CRYPTOSOMA, Brullé.

Cryptosoma, Brullé in Webb and Berthelot's Hist. Nat. des îles Canaries, Crustacés, p. 16.

Cryptosoma, Milne-Edwards, Hist. Nat. Crust., II. 110.

Cryptosoma, Miers, Challenger 'Brachyura,' p. 292.

Cycloes, De Haan, Faun. Japon. Crust., p. 68, and p. 125.

Carapace heart-shaped or subcircular.

Front rather narrow, and often emarginate.

Orbits, as in *Mursia*, large, oval, with a distinct suture or a fissure in the roof, and with two gaps in the floor, in one of which the slender basal-antennary joint is lodged. Eyes large, eyestalks short and thick.

The antennules fold obliquely.

The external maxillipeds meet sufficiently to conceal all the underlying (*i.e.*, really overlying) parts, and to completely close the buccal frame as far as the front. Concealed by the external maxillipeds there is, however, an endostomial efferent branchial channel closed by lamellar processes from the 1st pair of maxillipeds.

The antero-internal angle of the merus of the external maxillipeds is prolonged obliquely forwards to form a prominent lobule above the articulation of the palp.

The chelipeds are as in *Calappa* and *Mursia*: the meropodite, or "arm" has the same transverse ridge or crest near its distal end, externally; the palm is strongly compressed, with its upper border raised into a sharp serrated crest; and the chelipeds as a whole are symmetrical, except that on one hand the fingers have each, at the base, on their outer surface, a coarse tooth or lobule.

The legs are compressed and are of moderate size: none of them approach the chelipeds in length.

The abdomen in both sexes is much as in *Calappa*: in the male the 3rd, 4th and 5th terga are intimately fused together, and with almost complete obliteration of sutures; in the female all seven segments are perfectly distinct. In the majority of species the second abdominal tergum, in both sexes, is strongly carinate transversely, as in *Mursia*.

11. *Cryptosoma granulosum*, (De Haan).

Cycloes granulosa, De Haan, Faun. Japon. Crust. p. 71, pl. xix. fig. 3.

Cryptosoma granulosum, Miers, 'Challenger' Brachynra, p. 293: Alcock and Anderson, J. A. S. B., Vol. LXIII. 1894, pt. 2, pp. 198 and 203.

Carapace conspicuously longer than broad, its surface, like the exposed surfaces of the chelipeds, finely and very closely granular: in its anterior half there are also some small tubercles, most of which fall into seven nearly longitudinal rows, one row being in the middle line. The antero-lateral borders are very finely crenulate, and end at a tiny lateral-epibranchial denticle. The convergent postero-lateral borders, and the posterior border, are very finely and closely beaded. The outer parts of the pterygostomian and subhepatic regions are covered with a felt of fine short hairs.

The front is bidentate and projects beyond the level of the orbits: the latter occupy all the rest of the anterior border.

The antennary flagella are very short.

The transverse ridge at the distal end of the arm is granular, and is armed with three spines gradually increasing in size from within outwards: the upper surface of the wrist has several small tubercles: the outer surface of the hand has, at its base, an oblique crest, which ends acutely and is continued obliquely upwards as a line of small tubercles; a second line of tubercles runs parallel with this, obliquely across the middle of the hand: the crest of the hand is 8-dentate.

The last pair of legs has its four terminal joints distinctly lamellar.

The carina of the second abdominal tergum is in both sexes trilobed, the middle lobe being much smaller than the lateral lobes.

Andamans, depth not recorded: Maldives, 20-30 fms.

MATUTA, Fabr., Edw.

Matuta, Fabricius, Ent. Syst., Suppl. p. 369.

Matuta, Milne-Edwards, Hist. Nat. Crust. II. 113.

Matuta, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1877) p. 243, and 'Challenger' Brachyura, p. 294.

Matuta, de Man, Notes Leyden Mus. III. 1881, p. 109.

Carapace somewhat depressed, usually subcircular, with the postero-lateral borders sharply convergent, and usually with a great horizontal spike at the lateral epibranchial angle, on either side.

There are usually six more or less distinct tubercles, disposed quite symmetrically, in the middle of the carapace, and there is commonly an eminence, or even an acute tubercle, in the front half of the postero-lateral border.

The front is about as wide as the orbit, and consists of three nearly equal lobes, the middle one of which projects as a laminar rostrum with the end usually bifid or emarginate.

The orbits are large and roughly reniform: in the middle of the upper border are two short sutures, placed close together; at the external angle is a wide gap communicating with a deep groove in the pterygostomian region; while at the internal angle is a fissure communicating with the antennular fossa. The eyestalks are stout but somewhat elongate.

The antennules fold nearly longitudinally. The antennæ are almost rudimentary, and occupy a space between the basal-antennular joint and the lower wall of the orbit.

The external maxillipeds completely cover the mouth and all the mouth-parts, up to the level of the front, the patulous efferent branchial orifice being visible only from above. In repose the palp of the external maxillipeds lies completely concealed within a deep groove in the dorsal face of the long subacute meropodite.

On removal of the external maxillipeds a deep undivided efferent canal is seen in the roof of the endostome, which groove is closed below by an elongate lamellar process of the first pair of maxillipeds.

The chelipeds are shaped on the *Calappa* plan, but are quite singular in having, on the inner face, near the crest of the palm, two raised obliquely-striated areas—one linear, the other broadly oval—which in two species at any rate, and probably in all, are used as stridulating organs. The meropodite, or "arm," has the transverse distal crest low, and only well-pronounced at the outer angle, where there is a prominent lobule. The propodite or "hand" is compressed, but not so much so as in *Calappa*, and has its upper border cristate, and its outer surface definitely sculptured. The fingers, as well as the rest of the chelipeds, are quite symmetrical.

The four ambulatory legs have the form of swimming-paddles, the two terminal joints being broadened and compressed—in the first and last pairs of legs enormously so.

The abdomen in the adult male consists of 5 segments, owing to the intimate fusion of the 3rd, 4th and 5th terga: in the female and young male all 7 terga are distinctly separate. In both sexes the first tergum is almost entirely concealed beneath the carapace.

In the adult male the *third* tergum is very strongly carinate transversely, and the second moderately so. In the female and young male both the *second* and *third* terga are strongly carinate, and if there is any inequality it is the *second* that is most prominent.

Owing partly to their great similarity, and partly to the insufficient descriptions of earlier authors, the discrimination of the species of *Matuta* has always been a matter of difficulty.*

The first species described and figured is the *Cancer lunaris* of Rumph (Amboinsche Rariteitkamer p. 11, pl. vii., fig. S. 1705), a species characterized by the possession of an entire (i.e., not bifid) rostrum and of a very sharply defined tubercle near the middle of either posterior border.

This species must, I believe, be (1) the species called *M. banksii* by Leach, Miers, and subsequent authors, (2) the *M. picta* of Hess and Miers, (3) the *M. distinguenda* of Hoffmann, and (4) the *M. obtusifrons* of Miers. I think also that the *M. granulosa* of Miers and de Man is only a slightly abnormal form of Rumph's species.

Rumph's name having unfortunately been accepted for a quite different post-Linnaean species, cannot now be used; and Rumph's species must therefore bear the earliest applicable post-Linnaean name—namely *M. banksii*, Leach.

M. banksii according to Leach can be recognized by a very strong tubercle behind the lateral spine.

The second known species of *Matuta* is the *Cancer americanus* of Seba (Thesaurus III. 52, pl. xx., figs. 10, 11. 1758), of which it is impossible to say more than that it roughly represents the form of the genus *Matuta*.

Herbst (Krabben, etc., 1790–1799) described and figured two species of *Matuta*. One (Krabben, I. ii. 140, pl. vi. fig. 44), he called *C. lunaris*, and this he says is Rumph's species, quoting Rumph's Latin and vernacular names: the other (I. ii. 143) he called *C. victor* of Fabricius. Subsequently, however (III. ii. 43) he renamed *C. victor* *C. lunaris*, figured it on pl. xlviii. fig. 6, and stated that his *C. victor* and *C. lunaris* are the same species.

Herbst's two figures—pl. vi. fig. 44 and pl. xlviii. fig. 6—are so different, however, that doubts must still remain as to whether they both really do refer to the same species, and it does not seem to me that Hilgendorf's observations, to be presently referred to, clear these doubts up. I believe myself that Herbst's plate vi. fig. 44 might still be regarded, as Herbst at first seems to have regarded it, as representing Rumph's *Cancer lunaris*.

Fabricius who (Entomol. Syst., Snppl. p. 369, 1798) instituted the genus *Matuta*, included in it two species—*M. victor* and *M. planipes*. We know, from Hilgendorf's paper to be presently considered, to what species of modern authors these refer.

* Unfortunately I have not been able to see Latreille's article on the genus *Matuta* in the *Encyclopédie Méthodique*, Vol. X.

Leach (Zool. Miscellany III. pp. 12-14, 1817), gave brief diagnoses of four species of *Matuta*. One of these—*M. banksii*—I believe to apply to Rumph's *Cancer lunaris*.

A second—*M. lesneurii*—is referred by Miers, and I think with justice, to the *M. victor* of Fabricius.

A third—*M. peronii*—is also, and I think rightly, referred by Miers to *M. victor*, Fabr.

The fourth—*M. lunaris*—is regarded by Miers, whose paper will be considered in the sequel, as applicable to *M. picta* of Hess, a species characterized by having a simple rostrum and a tubercle in the postero-lateral border. Now Leach's figure shows a distinctly bilobed rostrum, and has no tubercle on the postero-lateral border, so that I do not see how the name *M. picta* can apply to it. Leach's *M. lunaris* seems to me rather to agree with the species described by Henderson as *M. miersii*.

To sum up, it seems to me that three species were known to Leach, namely *M. banksii*, Leach, (Rumph's species), *M. victor* Fabr. and perhaps the species now known as *M. miersii*, Henders.

The great naturalist Milne-Edwards only admitted two species of *Matuta*, namely *M. lunaris* and *M. victor*, and it is only because I have been able to examine over 400 specimens from all parts of the Indian coasts, that I venture to disagree from him.

I can reconcile his description of *M. lunaris* with the *M. lunaris* of Leach and with Guérin's figure of *M. peronii* (not Leach's); but on the strength of Hilgendorf's statements I do not see how it can be reconciled with Herbst's *Cancer lunaris*. Milne-Edwards italicizes the fact that the carpus of the penultimate pair of legs is *bicarinata*: now the only species known to me that agrees with his description in other respects, and has also the carpus of the penultimate legs full and indistinctly bicarinate, is Henderson's *M. miersii*.

The *M. victor* of Milne-Edwards seems to be Fabricius' species, although I do not think that the whole of the synonymy can be accepted.

Miers' classical attempt (Trans. Linn. Soc. Zool. (2) I. 1875-79 [1877] p. 243) to simplify the confusion existing in this group, although forming a careful critical and extremely valuable paper, yet fails for the reason that the character selected by Miers for the primary subdivision of the genus—namely the sculpture of the hands and fingers—varies not only according to sex (as Miers indeed fully recognized), but also according to age.

In Miers' system the adult males of *M. victor*, Fabr. and of *M. lunaris* Hbst. Hilgendorf, belong to one section of the genus, and the young males to the other section.

One has, of course, to be very careful in deciding that any given small specimen of *Matuta* corresponds with the young of any given large specimen; but when one finds, for example, that a small male individual, taken on the same spot with a large male and female, exactly resembles the adults in all important characters, and differs from the adult male, and agrees with the adult female, just in those very characters where the adult female differs from the adult male; when, therefore, such a young one can be confused with no other known species; and when moreover these agreements and differences are found to have a general correspondence throughout the whole genus; then one can with some confidence assign that young individual to its place.

One of the most constant differences, throughout the genus, between the adult

male on the one hand, and the female and young male on the other hand, is found in the second and third abdominal terga: in all adult males the third abdominal tergum is very strongly carinated transversely, and the second is carinated also, but not nearly so strongly: in all adult females both the second and the third terga are either equally strongly carinate, or, if one is more prominent than the other, it is the second.

The other differences between the sexes are those (emphasized by Miers) that occur in the sculpture of the hand and fingers; and these differences also apply between the adult male and the young male, which Miers does not appear to have taken into consideration.

The nine species separated by Miers can, in my opinion, be reduced to three, namely, *M. banksii* Leach (Rumph's species), *M. victor*, Fabr., and *M. lunaris* Hbst. Hilgendorf.

The next paper to be referred to is that by Hilgendorf (Monatsber. Ak. Berl. 1878 [1879] p. 810), which is a most authoritative contribution, since the writer had been able to examine Fabricius' types of *M. victor* and *M. planipes*, and apparently also Herbst's specimens. Dr. Hilgendorf states definitely (1) that *M. victor* Fabr. is the species carefully described and figured as *M. victrix* by Miers (*loc. cit.*); (2) that the species figured by Herbst on pl. xlviii. fig. 6 is the unequivocally recognizable *M. rubro-lineata* of Miers (*loc. cit.*); and (3) that the *M. planipes* of Fabricius is *M. lunaris* of Herbst. It is most unfortunate that Dr. Hilgendorf does not tell us whether both of Herbst's figures refer to the same species, or not. We now know, without any ambiguity, what Herbst's pl. xlviii. fig. 6 is; but we are still in doubt as to the meaning of pl. vi. fig. 44.

The last reference necessary is to de Man's paper (Notes Leyden Mus. III. 1881, p. 109), on the species of *Matuta* in the Leyden Museum, a paper that embodies the results of an examination of no less than 270 specimens. With most of Dr. de Man's synonymy I entirely agree, although I am unable to follow him in the acceptance of *M. granulosa*, *M. maculata* and *M. picta* as distinct species.

Dr. de Man rightly recognizes the value of the sculpture of the hand and fingers in the discrimination of the species; but, equally with Mr. Miers, he takes no due notice of the fact that this character varies with age, at any rate in the male sex. He considers that the development of the tubercles on the surface and lateral margins of the carapace furnishes a character of only secondary importance, in which opinion I cannot quite agree with him if he includes the tubercle on the postero-lateral border.

It remains only to refer to the opinions of those who, like M. A. Milne-Edwards and Dr. Ortmann, regard all the forms of *Matuta* as varieties of a single species. This view would seem to imply that the characters by which the species are usually recognized are variable,—either indefinitely so, or in response to some local peculiarities of the environment. Of this I can find no evidence.

Certain of the characters that I have used in separating the species in the Indian Museum Collection are, as far as an examination of over 400 specimens goes, perfectly well defined, whether in the young or in the adult, and whether from the same locality or not.

The characters of the first importance in the separation of the species are those emphasized by Milne Edwards, namely (1) the form of the carpus of the penultimate pair of legs—whether full and

"bicarinate," or compressed and unicarinate, and (2) the extent of the raised postero-lateral border—whether stopping short of the great lateral spine, or prolonged into the border of that spine. With regard to the first of these characters, it may be remarked that the distinction drawn is between a distinctly compressed carpus, and a distinctly inflated carpus. With regard to the second, the distinction drawn is between a sharply-raised border that (in any position of the carapace and in any light) can be plainly seen to form a considerable part of the hinder border of the great lateral spine, and a border that stops at the base of the spine or even further behind. The sculpture of the lower part of the outer surface of the hand is also very definite in all the species, and—if age and sex be taken into due consideration—the sculpture of the median ridge of the hand and of the dactylus. The presence or absence of a tubercle on the postero-lateral border is also of importance.

Key to the species of Matuta.

- [I. Carapace pentagonal, lateral epibranchial spine rudimentary *M. inermis*.*]
- II. Carapace more subcircular than pentagonal, lateral epibranchial spine greatly developed (*Indian species*):—
 - 1. Front just equal to the orbit in width, rostrum simple or faintly emarginate: a sharply defined acute tubercle near the middle of the posterolateral border *M. banksii*.
 - 2. Front distinctly wider than the orbit, rostrum distinctly bilobed: postero-lateral border with or without an obscurely defined eminence near its middle:—
 - i. Postero-lateral border elevated throughout, forming a considerable part of the hinder border of the great lateral spine, and without any trace of a tubercle or eminence: lower surface of hand very rough in the adults of both sexes *M. miersii*.

* *M. inermis*, Miers, Zoology H. M. S. 'Alert,' p. 256, pl. xxvi. fig. C. Known only from the Melanesian part of the Indo-Pacific area.

- ii. Postero-lateral border elevated posteriorly, gradually subsiding at or behind the great lateral spine, and with an obscurely defined eminence: lower surface of hand quite smooth in the adult male, a little rough in the female and young:—

- a. A distinct spine at the angle of the hand where it comes in contact with the external angle of the arm: carapace covered with minute red dots *M. victor*. *lunaris* (Forsk.)
- b. Only a tubercle at the angle of the hand where it touches the external angle of the arm: carapace covered with spots, rings, and vermicular lines... .. *M. lunaris*.
(*M. planipes*.)

12. *Matuta banksii*, Leach.

- Cancer lunaris*, Rumph, Amboinsche Rariteitkamer, I. p. 11, pl. vii. fig. S. (1705).
?? *Cancer lunaris*, Herbst, Krabben I. ii. 140, pl. vi. fig. 4¹ (nec III. i. 43, pl. xlviii. fig. 6).
?? *Matuta victor*, Bosc, Hist. Nat. Crust. I. 225, pl. iv. fig. 3, (nec Fabr.)
Matuta banksii, Leach, Zool. Miscell III. p. 14. (1817).
Matuta victor, Desmarest, Consid. Crust. p. 101, pl. vii. fig. 2 (nec Fabr.)
Matuta victor var. *quinta et sexta*, De Haan, Faun. Japon. Crust. p. 128.
Matuta banksii, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876) p. 245, pl. xl. figs. 1, 2, and Ann. Mag. Nat. Hist. (5) V. 1880, p. 315, and 'Challenger' Brachyura, p. 295: de Man, Notes Leyden Mus. III. 1881, p. 115, and Archiv. fur Naturgesch. LIII. 1887, i. p. 389, and in Weber's Zool. Ergeb. Niederl. Ost.-Ind. II. 1892, p. 351: A. O. Walker, Journ. Linn. Soc. Zool. XX. 1890, p. 111: Zehntner. Rev. Suisse de Zool. II. 1894, p. 183, pl. viii. fig. 15.
Matuta picta, Hess, Arch. für Naturges. XXXI. i. 1865, pp. 158, 172, pl. vi. fig. 13: Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79, (1876) p. 246, pl. xl. figs. 5-7, and 'Challenger' Brachyura, p. 295: E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 46 (gastric teeth): de Man, Notes Leyden Mus. III. 1881, p. 118, and Zool. Jahrbucher, II. 1887, p. 703: Haswell, Cat. Austr. Crust. p. 135.

Matuta distinguenda, Hoffmann in Pollen and Van Dam's Fauna Madagasc., Crust. p. 27, pl. vi. figs. 49-52, pl. vii. figs. 53-57 (1874): Lenz and Richters, Abh. Senk. Ges. XII. 1881, p. 425.

Matuta obtusifrons, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876), p. 247, pl. xl. figs. 8 and 9, and Ann. Mag. Nat. Hist. (5) V. 1880, p. 316.

? *Matuta granulosa*, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876) p. 245, pl. xxxix. figs. 8, 9, and 'Challenger' Brachyura, p. 295: de Man, Notes Leyden Mus. III. 1881, p. 114: Haswell, Cat. Austral. Crust. p. 134.

Matuta victor, varr. 5 and 6, and ? 4, Ortmann, Zool. Jahrbucher, Syst., &c., VI., 1891-92, pp. 572, 573.

Carapace coarsely granular in the epibranchial, post-gastric and cardiac regions. All six tubercles are almost always very distinct, both in the young and adult.

The antero-lateral borders are crenulate, the last three crenulations forming three large blunt teeth. The posterior and postero-lateral borders form a continuous granular slightly-elevated ridge, which stops at a sharply-defined tubercle, or tooth, situated considerably in rear of the lateral epibranchial spine. The length of this lateral spine (measured along its front border) is always less than one-fourth the breadth of the carapace.

Front just equal in width to the orbit: rostrum either entire, or faintly emarginate.

Hand with the upper border, or crest, trilobed, and the lower border dentate as far as the base of the immobile finger. Below the crest are two obliquely-longitudinal rows of tubercles, the lower somewhat broken and irregular. Below these, the hand is traversed longitudinally, as far as the finger-cleft, by a row of 5 teeth, of which the 2nd (counting from the proximal end) is enlarged and acute, and the 4th is also somewhat enlarged and acute, but less so in the adult male than in the female and young male. The surface of the hand, below the ridge, is roughened, and is traversed—from the angle where the hand touches the arm, to the immobile finger—by a row of molariform tubercles, which is continued to the tip of the immobile finger as a ridge and furrow: the first of these tubercles, at the angle where the hand touches the arm, is enlarged and acute. The dactylus in the female and young male is convex and smooth: in the adult male it is longitudinally traversed by a sharp ridge, which becomes milled at the distal end.

The carpus of the penultimate pair of legs is full and even inflated, and shows more or less distinct traces of a second dorsal longitudinal carina.

Colour in spirit bright yellow, with a fine close discontinuous reticulum of red markings, which give to the whole, when viewed from a distance, a rich chestnut-brown appearance. The legs are also of the

same bright yellow colour, with copious chestnut-brown markings. Under surface light yellow.

In the Indian Seas only at the Andamans and Nicobars.

The branchial cavity in this species is often occupied by a Bopyrid.

I have examined 63 specimens in the Indian Museum collection, comprising 19 adult males, 28 females, and 16 young males.

13. * *Matuta victor*, Fabr., Hilgendorf.†

Cancer victor, Fabricius, Ent. Syst. II. 449 (*vide* Hilgendorf). 1793.

Matuta victor, Fabricius, Ent. Syst. Suppl., p. 369 (*vide* Hilgendorf).

Matuta victor, Milne Edwards in Cuvier, Règne Animal, Crust. pl. vii. and Hist. Nat. Crust. II. 115.

Matuta victor, var. *prima et secunda*, De Haan, Faun. Japon. Crust. p. 127.

Matuta victor, Hilgendorf in Von der Decken's Reisen in Ost.-Afr. III. i. Crust. p. 93, pl. iii. fig. 2: Hoffmann in Pollen and Van Dam's Faun. Madagasc., Crust., p. 27, pl. vi. figs. 45-48: HILGENDORF, MB. AK. BERL. 1878, p. 810.

Matuta victrix, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876) p. 243, pl. xxxix. figs. 1-3, and Ann. Mag. Nat. Hist. (5) V. 1880, p. 315, and Zool. H. M. S. 'Alert' pp. 185, 256, and 'Challenger' Brachyura, p. 295: de Man, Notes Leyden Mus. III. 1881, p. 110, and Archiv für Naturges. LIII. 1887, i. p. 389: Haswell, Cat. Austral. Crust. p. 133: J. R. Henderson, Madras Journ. Lit. Sci. 1886-87, p. 65, and Trans. Linn. Soc. Zool. (2) V. 1893, p. 396: Ortmann, Zool. Jahrbucher, Syst. etc. VI. 1891-92, varr. 1 and 2 pp. 571-572.

Matuta victrix var. *crebrepunctata*, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876), p. 244, pl. xxxix. fig. 4, and 'Challenger' Brachyura, p. 295: de Man in Weber's Zool. Ergeb. Niederl. Ost.-Ind. II. p. 351.

Matuta peronii, Leach (*nec* Guérin), Zool. Miscell. III. p. 13, pl. 127, figs. 1, 2.

Matuta lesueurii, Leach, Zool. Miscell. III. p. 14.

Matuta maculatu, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876) p. 246, pl. xl. figs. 3, 4, and 'Challenger' Brachyura, p. 295: de Man, Notes Leyden Mus. III. 1881, p. 116.

Carapace finely granular in the epibranchial, post-gastric and cardiac regions. The two anterior tubercles are obsolescent; the other four are visible, but are not conspicuous in the adult.

The antero-lateral borders are crenulate, two—sometimes three—of the crenulations being somewhat enlarged, but never forming stout teeth. The posterior and postero-lateral borders form a continuous finely-beaded slightly-elevated ridge, which ends on a faintly-marked elevation, situated considerably in rear of the lateral spine. The length of the

* The specific name *victor* is here regarded as a noun substantive in apposition to *Matuta*, just as in the name *Felis leo*, the masculine noun *leo* is in apposition to the feminine noun *felis*. It seems unnecessary to change the old established name *M. victor* for a name based on the personal claims of the goddess *Matuta*.

† No references are given, except such as appear to be unequivocally applicable to *M. victor* as re-defined by Miers and confirmed by Hilgendorf.

Lateral spine is always very much more than one-fourth—often more than one-third—the breadth of the carapace.

The front is wider than the orbit: the rostrum is sharply bilobed.

Hand with the crest trilobed—the proximal lobe broad, the others acute, and with the lower border dentate (female and young male) or bluntly crenulate (adult male) as far as the base of the immobile finger. Below the crest, on the upper aspect of the hand, are two obliquely-longitudinal rows of tubercles, the lower of which is somewhat broken and irregular. Below these the hand is traversed longitudinally by a ridge, which varies according to age and sex: in the adult male it is strongly salient and is continued nearly to the tip of the immobile finger, and has at its proximal end a tubercle followed by a spine: in the female and younger male it becomes nearly obsolete at the base of the immobile finger, and is broken up into five lobes, of which the second (counting from the proximal end) and the fourth are spines—the second being very large. The surface of the hand below this ridge is smooth in the adult male, except for a strongish spine at the angle where the hand touches the arm; but in the female and younger male it is traversed just above the lower border by a raised but broken ridge, which is most distinct on the immobile finger. The dactylus varies also according to sex and age: in the adult male its external surface is traversed from base to tip by a strongly-milled ridge: in the adult female and youngest males there is little trace of ridge, and none of milling: and the ridge and milling gradually appear in the male with growth, often showing on one hand before the other.

The carpus of the penultimate pair of legs is compressed, and is surmounted dorsally by a single carina.

Colours of carapace, in spirit, dull yellowish-brown to dull olive-green, with a multitude of speckles.

Indian coasts—Penang, Tavoy, Arakan, Andamans, Ganges Delta, Máhánaddi Delta, Madras, Ceylon, Malabar coast, Karáchi.

I have examined 41 adult males, 120 females, and 49 young males in the Indian Museum collection.

This grows to a larger size than any other species of *Matuta*.

14. *Matuta lunaris* (Herbst) Hilgendorf.¹

? *Cancer lunaris*, Herbst, Krabben I, ii. 140, pl. vi. fig. 44, (1790).¹⁷

Matuta planipes, Fabricius, Ent. Syst. Suppl. p. 369 (*vide* Hilgendorf), 1798.

Matuta lunaris, Herbst (*nec* Rumph) Krabben, III. i. 43, pl. xlviii. fig. 6 (*vide* Hilgendorf), 1799.

¹ No references are given except such as appear to be unequivocally applicable to the *M. lunaris* of Hilgendorf.

Matuta appendiculata, Bosc, Hist. Nat. Crust. I. 225.

Matuta victor, var. *tertia* et *quarta*, DeHaan, Faun. Japon. Crust. pp. 127 and 128.

Matuta lunaris, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876) p. 247, pl. xl. figs. 10-11 (♀ and young ♂), and 'Challenger' Brachyura, p. 295: HILGENDORF MB. AK. BERL. 1878, p. 810: de Man, Notes Leyden Museum, III. 1881, p. 112: Henderson, Madras Journ. Lit. Sci. 1886-87, p. 66, fig. 6, and Trans. Linn. Soc. Zool. (2) V. 1893, p. 396.

Matuta rubrolineata, Miers, Trans. Linn. Soc. Zool. (2) I. 1875-79 (1876), p. 244, pl. xxxix. figs. 5, 6.

Matuta lineifera, Miers, *op. cit.*, p. 245, pl. xxxix. fig. 7: Haswell Cat. Austral. Crust. p. 134.

Matuta circulifera, Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 315, pl. xiv. fig. 5, and Challenger Brachyura, p. 295.

Matuta laevidactyla, Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 316 (footnote), and 'Challenger' Brachyura, p. 296 (♀ and young ♂).

Matuta victor, var. 3, Ortmann, Zool. Jahrbucher, Syst. &c. VI. 1891-92, p. 572.

Except in colour this species resembles *Matuta victor* very closely, differing only in the following characters:—

(1) the carapace is almost smooth, and the tubercles in the adult, but not in the young, are *all* indistinct:

(2) instead of a spine at the angle where the hand comes in contact with the distal lobule of the arm, there is only a tubercle, or a pair of tubercles:

(3) the fourth lobe of the median longitudinal ridge on the outer surface of the hand is not enlarged or acute: so that, in both sexes, and at all ages, there is only one large spine on the outer surface of the hand. Apart from this, exactly the same sexual and growth-differences occur in the hand as in *M. victor*:

(4) the colour of the carapace, in spirit, is bright yellow with vermicular red lines, which usually form spots or incomplete rings on the anterior half of the carapace and narrow longitudinal loops posteriorly.

I have heard this species stridulate.

Indian coasts—Mergui, Andamans, Burma, Sunderbunds and Gangetic Delta, Máhánaddi Delta, Madras, Bombay, Karáchi.

In the Indian Museum collection are 5 adult males, 55 females (many ovigerous), and fifteen young males.

The question of uniting this species with *M. victor*, as a variety, has to be carefully considered. After examining 210 specimens of *M. victor* and 75 of *M. lunaris* I find that the differences between them hold good irrespective of age or sex, and I would therefore regard the two species as perfectly distinct. I acquiesce in the name *M. lunaris* only on the supposition that Hilgendorf's remarks apply to *both* of Herbst's figures. If they do not apply to Herbst's pl. vi. fig. 44, then the Fabrician name *M. planipes* would have the priority.

15. *Matuta miersii*, Henderson.

? *Matuta peronii*, Guérin Méneville, Icon. Règne Animal, pl. i. fig. 1 (*nec* Leach).

?? *Matuta lunaris*, Leach, Zool. Miscell. III. p. 13, pl. 127, figs. 3-5.

? *Matuta lunaris*, Milne-Edwards, Hist. Nat. Crust. II. 114 (*nec* Rumph, *nec* Herbst).

Matuta miersii, Henderson, Madras Journ. Lit. Sci. 1886-87, p. 66, figs. 1-4, and Trans. Linn. Soc. Zool. (2) V. 1893, p. 396.

Carapace granular upon the eminences that support the tubercles, and towards the lateral epibranchial spines. All six tubercles of the carapace almost always distinct, both in the young and adult.

The antero-lateral borders are crenulate, the last three crenulations forming three large blunt teeth. The posterior and postero-lateral borders form a continuous, beaded, strongly-elevated ridge, which runs about half way along the edge of the lateral epibranchial spine and has in its course no trace of a tubercle or eminence. The length of the lateral spine is always, even in the young, less — often much less — than one-fourth the breadth of the carapace.

The front is wider than the orbit: the rostrum is distinctly bilobed.

Hand with the upper-border trilobed,—the lobes being almost always equal and acute, and with the lower border dentate, in both sexes and at all ages, as far as the base of the immobile finger. Below the crest, on the upper aspect of the hand, are two obliquely longitudinal, regular, unbroken rows of close-set teeth. Below these the hand is traversed longitudinally, as far as the finger-cleft, by a row of 5 teeth, the second of which (counting from the proximal end) is enlarged and acute. The surface of the hand below this ridge, as well as the surface of the immobile finger, is roughened, and is traversed longitudinally, at least as far as the middle of the finger, by a row of molariform tubercles, which row is sometimes incompletely double; but none of the tubercles are acute.

The characteristic sculpture of the hand is the same in the young and adult, in both sexes.

The carpus of the penultimate pair of legs is full, not compressed, and shows more or less distinct traces of a second dorsal carina.

Colour of carapace in spirit: olive yellow with red dots which are arranged in broadish vermicular lines and rings.

This is the smallest of all the species of *Matuta*: the largest male in the collection of the Indian Museum has a carapace-breadth of only 29 millim., and the largest ovigerous female a carapace-breadth of only 20 millim., although there is a single female — non-ovigerous — as large as the largest male.

It can be at once distinguished from *M. banksii* — which it most nearly resembles — by the complete absence of a tubercle on the postero-

lateral border; and by this border being elegantly beaded, raised in very strong relief, and continued far along the edge of the lateral spine.

In the Indian Seas this species has only been found on the Madras coast.

Although I have frequently dredged it, I have never done so in less than nine fathoms. I have on more than one occasion heard it make a musical noise audible at several yards distance.

As Henderson has remarked, a *Sacculina* is often found parasitic on the male.

In the Museum collection are 14 adult males, 40 females, and 15 young males.

Family LEUCOSIIDÆ.

Leucosiens, Milne-Edwards, Hist. Nat. Crust. II. 118.

Leucosidea, De Haan, Faun. Japon. Crust. p. 129.

Leucosifidæ, Dana, U. S. Expl. Exp. Crust. pt. I. p. 390.

Leucosiadæ, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 277.

Leucosiidæ, Miers, 'Challenger' Brachyura, p. 297.

Carapace circular or oval or polygonal. Eyes and orbits very small: front narrow but many times wider than the orbit. The antennules fold more or less obliquely. The antennæ are small, sometimes obsolete. The external maxillipeds completely close the buccal cavern, except that very commonly there is a crevice in front: their palp or flagellum springs from a groove in their dorsad surface near the inner edge, and is completely concealed when the maxillipeds are in repose: the exognath is broad, sometimes remarkably broad.

The afferent branchial channels occupy the sides of the endostome on either side of the deep median endostomial groove which, as in the *Calappidæ*, serves as an efferent branchial channel. The afferent channels are covered in by the exognaths of the external maxillipeds; the efferent channel is covered in immediately, as in the *Calappidæ*, by a pair of lamellar processes from the first maxillipeds.

The chelipeds are symmetrical and have no remarkable peculiarity of form.

The abdominal terga are very rarely distinctly separate: commonly in both sexes the 3rd-6th are intimately fused with obliteration of sutures, sometimes however the 6th also is independent, and in a few forms the sutures are not obliterated.

The vasa deferentia emerge through the 5th thoracic sternum on either side, near the bases of the 5th legs.

The *Leucosiidæ* are such a natural group, and the various forms of which it is composed show so many intergradations, that any attempt to split it up into "sub-families" must be received with caution.

Among the genera known to me by autopsy, however, two extremes of form are plainly recognizable, and I propose to use these two extremes as the bases of two natural alliances or sub-families.

The first alliance is typified by *Leucosia* and *Philyra*, the second by *Ilia* and *Iphiculus*.

In *Leucosia* and *Philyra* the merus of the external maxillipeds is as long as the ischium measured along the inner border; the fingers are stout and compressed, taper gradually from a broad base, and are usually shorter than the hand; the hand is stout, compressed, and if anything a little broader at its distal end than at its base; and when the specimen is laid face downwards on the table, with the chelipeds resting on the table in a semi-flexed position, the fingers open and close in a horizontal plane.

In *Ilia* and *Iphiculus*, on the other hand, the merus of the external maxillipeds is only half the length of the ischium measured along the inner border; the fingers are slender and of almost the same diameter from the base to near the hook-like tip, and are very much longer than the hand; the hand is either subglobular, or tapering-cylindrical with a swollen base; and when the specimen is placed in the position above described, the fingers open and close in either a vertical or oblique plane, and in *Iphiculus* the dactylus can, without any breakage or unnatural dislocation of parts, be moved through an arc of about 120° .

Speaking only of the genera known to me by autopsy, the following, though they differ a good deal from *Leucosia* in the characters under consideration, do not differ nearly so much as they do from *Ilia*:—*Pseudophilyra*, *Myra*, *Parilia*, *Randallia*, *Ebalia*, *Nursia*, *Merocryptus*, *Onychomorpha*. *Tlos* and *Oreophorus* also, although their fingers move in a nearly vertical plane, yet in other respects show no close affinities with the *Ilia* type, but rather, through *Nursia*, with the *Leucosia* type; and *Actæomorpha* goes with *Oreophorus*.

On the other hand, the following Indian genera belong to the *Ilia* alliance:—*Myrodes*, *Iphiculus*, *Nursilia*, *Arcania*. *Ixa* also, although its fingers are much shorter than the hand, clearly in other respects belongs to this alliance.

I would define these two subfamilies as follows:—

1. Subfamily *Leucosiinæ*. Merus of external maxillipeds more, often much more, than half the length of the ischium measured along the inner border: fingers stout, gradually narrowing from base to tip, seldom much longer, commonly shorter, and often very much shorter than the hand, either opening in a horizontal plane or if in a vertical plane then the immobile finger is markedly more massive than the dactylus, the tip of the dactylus hardly ever movable through an arc

of over 60° : hands stout, generally longer than broad, and compressed, hardly ever broader at the base than at the distal end — when short broad and swollen (as often occurs in the Oreophoroid alliance) then the immobile finger is markedly more massive than the dactylus.

2. Subfamily *Iliinæ*. Merus of external maxillipeds half or less than half the length of the ischium measured along the inner border: fingers slender, almost of the same diameter from base to near tip, either very much longer than the hand, or if shorter than the hand then of filiform slenderness; either opening and closing in a vertical plane, or if in a nearly horizontal plane then the tip of the dactylus is movable through an arc of about 120° : hands either short swollen and subglobular, or tapering-cylindrical with a swollen base, always much broader at the base than at the point of origin of the fingers.

The following is a list of the genera of Leucosoid Crabs, so far as known to me, arranged in accordance with the classification here proposed. Indian genera are printed in Roman type, and all genera known to me by autopsy are marked with an asterisk:—

Family Leucosiidæ.

Sub-family I. *Leucosiinæ*.

ALLIANCE I. OREOPHOROIDA.

* Actæomorpha.

? *Carcinaspis*, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 161.

Cryptocnemus, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 161.

* *Heteronucia*, *n. gen.*

* *Merocryptus*, A. Milne-Edwards, Journ. Mus. Godeff. I. iv. p. 84 (260). 1873. [Transition towards *Nursia*].

* Oreophorus.

Spelæophorus, A. Milne-Edwards, Ann. Soc. Ent. Franc. (4) V. 1865, p. 148.

* Tlos.

Uhlias, Stimpson, Ann. Lyc. Nat. Hist., New York, X. 1874, p. 117.

ALLIANCE II. NURSOIDA.

* Ebalia.

Lithadia, Bell, Trans. Linn. Soc. XXI. 1855, p. 305.

* Nursia.

Phlyxia, Bell, Trans. Linn. Soc. XXI. 1855, p. 303.

[*Bellidilia*, Kinahan, Journ. Roy. Dub. Soc. I. 1858, p. 128: regarded by Miers, 'Challenger' Brachyura, as synonymous with (*Phlyxia* and) *Ebalia*.]

ALLIANCE III. NUCIOIDA.

- * Nucia.
- * Parilia.
- * Randallia.

ALLIANCE IV. MYROIDA.

- Leucosilia*, Bell, Trans. Linn. Soc. XXI. 1855, p. 295.
- * Myra (= *Myropsis*, Stimpson).
- * *Persephona*, Leach, Zool. Miscell. III. 22 (1817) [= *Guaia*, Milne-Edwards, vide Bell, Trans. Linn. Soc. XXI. 1855, p. 292.

ALLIANCE V. LEUCOSIOIDA.

- * Leucosia. *p. 209*
- * Onychomorpha (perhaps the only known representative of a distinct alliance).
- * Philyra.
- * Pseudophilyra.

Sub-family II. *Ilinæ*.

ALLIANCE I. MYRODOIDA.

- Callidactylus*, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 157.
- * Myrodes.

ALLIANCE II. IPHICULOIDA.

- * Iphiculus.
- * Pariphiculus, *n. gen.*

ALLIANCE III. NURSILIOIDA.

- * Heterolithadia.
- * Nursilia.

ALLIANCE IV. ILIOIDA.

- * Arcania (= *Iphis*, Leach).
- * *Ilia*, Leach, Zool. Miscell. III. 19: Milne-Edwards, Hist. Nat. Crust. II. 123.
- Iliacantha*, Stimpson, Bull. Mus. Comp. Zool. II. 1870-71, p. 155: Miers 'Challenger' Brachyura, p. 301.
- * Ixa.

I. *Key to the Indian genera of the sub-family Leucosininae.*

- I. Carapace convex or subglobular; subcircular, oval, or hexagonal in outline; its surface may sometimes be more or less covered with bead-like or vesiculous granules, but it is generally quite smooth and often polished to the naked eye; the hepatic regions may sometimes form independent convexities, and the intestinal region may sometimes be delimited by a groove or by creases, but as a rule the regions are merged in the general convexity of the carapace. The eyes are very small; and the orbits are complete—the edge of the roof being not, or little, emarginate, and the outer wall, though marked by closed sutures, not being fissured: there is little or no space between the edge of the floor of the orbit and the free edge of the buccal cavern—the two practically coinciding: antenneae distinct:—
1. Chelipeds massive: posterior margin of carapace smooth, although sometimes, especially in the young, its extreme ends may be dentiform: intestinal region never tumid and acuminate: merus of external maxillipeds nearly as long as, or sometimes even longer than, the ischium measured along the inner border:—
- i. Front narrow, prominent, forming a distinct snout projecting beyond the subhepatic or pterygostomian regions which are never puffed out: buccal cavern elongate: the exopodite of external maxillipeds narrow and elongate, with the outer margin straight:—
- a. Either a circumscribed cavity or a deep depression in the ventrad surface of the carapace above the base of the chelipeds LEUCOSIA.
- b. No cavity in the carapace above the base of the chelipeds PSEUDOPHILYRA.
- ii. Front broad and remarkably truncated, the whole or the greater part of the edge of the buccal cavern being seen beyond it in a dorsal view: buccal cavern broad: exopodite of external maxillipeds broad (often remarkably expanded), its outer and anterior borders forming a continuous nearly semicircular curve PHILYRA.
2. Chelipeds only moderately stout, or even rather slender: three spines or long petaloid processes on the posterior border, the middle one of which belongs to the tumid intestinal region: merus of external maxillipeds not quite two-thirds the length of the ischium measured along the inner border: pterygostomian regions always puffed out beyond the level of the true antero-lateral margin of the carapace..... MYRA.

II. Carapace strongly convex, or globular; circular or oval in outline, the regions usually, but not always, defined by distinct grooves: orbits rather incomplete, the roof being markedly emarginate, and the outer wall being often cleft by fissures (which are sometimes quite-closed sutures): a space of remarkable depth between the edge of the lower wall of the orbit and the free edge of the buccal cavern: posterior margin of carapace most commonly, but not always, armed with spines or tubercles: front truncated, narrow, almost always sunk behind the level of the edge of the buccal frame: *pterygostomian regions remarkably puffed out, often convex beyond the front*: merus of external maxillipeds not much shorter than the ischium measured along the inner border: antennae very distinct:—

1. Buccal cavern transversely oblong, much broader than long, owing to the enormous width of the afferent branchial canal and of the exognath, the latter foliaceous with the outer and anterior borders forming a continuous semicircular curve: carapace ovoidal, finely scabrous: chelipeds slender—in the adult male more than four times the length of the carapace.....
2. Buccal cavern triangular, exognath not expanded: surface of carapace pustulous or densely vesiculous (if smooth to the naked eye the vesiculous appearance can be detected under a lens):—
 - i. Carapace almost circular and globular: legs slender: chelipeds from once and a half to twice and a half the length of the carapace.....
 - ii. Carapace transversely oval, manifestly broader than long, its lateral margins coarsely spinate: legs remarkably stout: chelipeds very short and stout

III. Carapace consisting of two parts namely (1) a low convex subcircular perfectly smooth crown, formed by the carapace proper, and (2) a thin broad unbroken brim formed by the front and the confluent lateral and posterior margins: merus of external maxillipeds considerably longer than the ischium: eyes and orbits as in I: antennae obsolete.....

IV. Carapace very rarely approaching a subcircular or ovoidal shape, commonly broad and polygonal; its surface always broken, nodular, tuberculous, wrinkled, or eroded; most commonly the regions are well delimited by grooves or by inequalities of level: almost always a distinct space between the edge of the floor of the orbit and the free edge of the buccal cavern: antennae often indistinct, sometimes obsolete:—

1. Edge of roof of orbit markedly emarginate, so that the retracted eye is a good deal exposed to dorsal view: antennulary fosse in open communication with orbits: space between floor of orbit and free edge of buccal cavern rather narrow: fingers opening in a horizontal plane, and of normal shape: antennae minute, but distinguishable:—
 - i. Carapace pentagonal or hexagonal, little or not at all broader than long, its lateral borders not expanded, its regions usually tumid and well defined by grooves or in-

PARILIA.

RANDALLIA.

NECIA.

ONYCHOMORPHA.

equalities of surface: antennary flagella minute but distinct: merus of external maxillipeds a great deal more than half the length of the ischium measured along the inner border.....	EBALIA.
ii. Carapace usually much broader than long, broadly and irregularly pentagonal, its margins thin depressed and expanded, with the edges often jagged; its posterior margin being on a well-defined plane, distinct from, and much lower than, the general plane of the carapace; its surface usually traversed by ridges radiating from the centre, which do not define the regions: antennary flagella minute and difficult to detect: merus of external maxillipeds not much more than half the length of the ischium measured along the inner border	NURSA.
2. Orbits very complete, and not in open communication with the antennulary fossæ: a broad space between edge of floor of orbit and free edge of buccal cavern: antennary flagella obsolete or very minute: carapace very markedly broader than long, its surface remarkably nodular, or eroded, or both; expanded laterally so as sometimes to partly or entirely conceal the legs in flexion: merus of external maxillipeds a good deal more than half the length of the ischium: immobile finger markedly more massive than the dactylus:—	
ii. i. Lateral expansions of carapace entirely concealing the legs in flexion: basal antennal joint though tightly filling the gap at the inner canthus of the orbit, yet quite independent: fingers clumsy, cupped on the inner face, closing in a vertical plane, the immobile finger monstrous:—	
a. Carapace enormously convex, honeycombed by large symmetrically-disposed undermined caverns and channels.....	OREOPHORUS.
b. Carapace humped behind, flattened and cupped at the sides, the lateral margins formed each of three broad foliaceous lobes which are fused but still display the sutures.....	TLOS.
ii. Sides of carapace only partly or slightly concealing the legs in flexion: basal antennal joint fused with the orbit, which except for a narrow fissure in the lower wall forms an unbroken ring:—	
a. Antennæ quite obsolete: fingers shorter than palm, opening obliquely: abdomen in both sexes with all the segments separate: meropodites of legs somewhat concealed, in flexion, by the carapace.....	ACTEOMORPHA.
b. Antennary flagella present, very minute: fingers longer than palm, opening vertically: abdomen of female (male unknown) with the 3rd-6th terga indistinguishably fused: legs hardly at all concealed, even in flexion, by the carapace	HETERONUCIA.

II. Key to the Indian genera of the sub-family Iliinae.

I. Hands not much longer than broad, short squat swollen or subglobular : fingers always much longer than the hand, opening either in an obliquely vertical or sometimes in a nearly horizontal plane :—

1. The whole body and appendages covered with a close spongy pubescence :—
i. Carapace much broader than long, its antero-lateral margins armed with large spines increasing in size from before backwards : tip of dactylus movable through an arc of about 120°

ii. Carapace oval (longitudinally) or globular, its margins with small dentiform tubercles : tip of dactylus movable through an arc of about 70°

2. Carapace practically free of pubescence :—

i. Carapace longer than broad, elongate-oval, smooth, shaped almost exactly as in *Myra* : tip of dactylus movable through an arc of about 120°

ii. Carapace broader than long, not smooth :—

a. Carapace polygonal, with the lateral margin laminar and sinuous or jagged, and with some definite ridges and spines on the surface—shaped, in fact, much as in *Nursia* : tip of dactylus movable through an arc of about 130°

b. Carapace oval, its surface closely granular and nodular, the hepatic regions much sunken : tip of dactylus movable through an arc of about 70°

II. Hands much longer than broad, tapering from a swollen base : fingers opening in a nearly vertical plane, the tip of the dactylus movable through an arc of 60° to 70° :—

1. Carapace more or less globular, its margins with definitely-disposed large spines or tubercles : fingers either longer or not very much shorter than the hand

2. Sides of the carapace produced into two huge cylindrical sausage-shaped processes : median regions of the carapace separated from the lateral regions by broad channels or grooves : figures not half the length of the hand

IPHICULUS. p. 256.

PARIPHICULUS. p. 257.

MYRODES. p. 254.

NURSILIA.

HETEROLITHADIA.

ARCANIA. p. 257.

IXA. p. 70.

Actæomorpha, Miers.

Actæomorpha, Miers, Journ. Linn. Soc. Zool., Vol. XIII. 1878, p. 184.

Carapace Cancroid, convex, granular. Front broad, not projecting much. Orbits quite complete. *Antennary flagella absent, basal joint present and fused with the orbit to form its inner wall.* The antennules fold obliquely.

The external maxillipeds close the buccal cavern completely: their exopodite is narrow, with the outer edge almost straight: the triangular merus is about two-thirds the length of the ischium measured along the inner border.

Chelipeds massive, not, or hardly, longer than the carapace: hand short and broad, and about the same length as the stout compressed fingers.

True legs short and stout: the meropodites, in flexion, are somewhat hidden beneath the carapace.

The abdomen in both sexes has all seven terga distinctly separate, and in the male is narrow-ovate.

In general appearance *Actæomorpha*, as Miers states, much resembles the Cancroid *Actæa granulata*: it is, however, a true Leucosid, and closely related to *Oreophorus*, as Miers has stated.

Key to the Indian species of Actæomorpha.

1. Regions of carapace separated by deep clean cut channels *A. morum*.
2. Regions of carapace separated by shallow shelving grooves *A. lapillulus*.

16. *Actæomorpha morum*, n. sp. Plate VIII. fig. 3.

Carapace broader than long, somewhat oval, strongly convex, closely covered—like the whole body—with large smooth crowded vesiculous granules. The regions of the carapace as a whole are completely isolated from a broad marginal ring by a broad sculptured circumferential groove, a very narrow bridge alone connecting the front with the gastric region: and the regions are again most elegantly isolated from each other (1) by two obliquely-longitudinal channels that cut off the acutely-triangular gastro-cardiac region from the somewhat reniform branchial regions, and (2) by a transverse channel that cuts off the semi-oval intestinal region—the channels being all in communication with the marginal channel. The isolated marginal ring consists of the front, which is thickened, broad, and slightly prominent; of the posterior margin, which is thickened, slightly curved, and slightly prominent; and of four sharp-cut lateral lobes on either side.

The eyes and orbits are visible in a dorsal view.

The chelipeds and legs are closely crowded with large granules, which on the under surface are smooth and vesiculous, and on the upper surface are spiniform. The chelipeds in the female are about as long as the carapace: the hands are about as long as the fingers: the fingers are traversed by close rows of tiny granules nearly to the tip. The legs are stout and short, with very slender hairy dactyli: in flexion they are somewhat hidden by the carapace.

Orange colour in spirit.

Two females from a bottom of sand and shells, off the Ganjam Coast, 28 to 30 fathoms. They do not seem to be quite adult, and the carapace is 10 millim. long and 12 millim. broad.

17. *Actaeomorpha lapillulus*, n. sp.

Carapace broader than long, strongly convex, crowdedly pustulous: its regions are all well-defined by shallow grooves, and the branchial and intestinal regions are also separated from the margin by shallow grooves. The front is somewhat prominent, and is obscurely bilobed; the hepatic regions though dorsally sunken are angularly convex in the antero-lateral margin, the lateral margins are coarsely and bluntly three-lobed, and the posterior margin is thickened and somewhat prominent. The eyes are hardly visible in a dorsal view. The under surface of the body is closely granular.

The chelipeds are everywhere nodular and pustulous, and the legs are more or less granular on the under surface, and are covered on the dorsal surface with crowded spiniform granules. The chelipeds in the female are about as long as the carapace, and the hands are about as long as broad and not much longer than the fingers. The legs are stout and short, and are somewhat hidden by the carapace in flexion,—that surface of the carapace being somewhat grooved by the pressure of the meropodites.

Colours in spirit: yellowish white, mottled with orange.

Two males and a female from off Ceylon, 34 fms., and a female from off Ceylon 32 fms., the bottom in both cases consisting of broken coral and shells.

The largest specimen—a female not quite adult—has a carapace 9 millim. long and 11 millim. broad.

Oreophorus, Rüppell.

Oreophorus, Rüppell, Beschreibung, etc., Kurzschwänzigen Krabben des rothen Meeres, p. 18 (1830).

Oreophorus, Milne-Edwards, Hist. Nat. Crust. II. 130.

Oreophorus, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 306, and Cat. Leucos. Brit. Mus. p. 18.

Carapace broadly semi-elliptical or subpentagonal, so that its postero-lateral margins overhang and completely conceal the legs in flexion (much as in *Calappa*); strongly convex, nodose, and often symmetrically eroded or honey-combed. The front forms a distinct, slightly upturned, triangular projection, with the orbits almost on its under surface.

Eyes small; orbits quite complete, the inner canthus being completely closed by the tight-fitting basal antennal joint. No antennary flagella. Antennules folding obliquely.

The external maxillipeds close the buccal cavern completely: their exopodite is narrow, with the outer edge almost straight: the triangular merus is nearly two-thirds the length of the ischium, measured along the inner border.

Chelipeds massive, not very much longer than the carapace: hand short and broad: fingers about twice as long as the hand, their inner surface hollowed like a spoon: the immobile finger enormously massive.

True legs small, and hidden, when flexed, by the lateral expansions of the carapace.

The abdomen of the male consists of three pieces, and is acutely triangular; that of the female consists of four pieces.

In India these little crabs are found only on bottoms of dead coral shingle, to the eroded fragments of which the crabs themselves have a most extraordinary likeness, the likeness being increased by an encrusting growth of *Foraminifera*, *Polyzoa*, etc., to which the crabs like the shingle, are subject.

18. *Oreophorus reticulatus*, Adams & White.

Oreophorus reticulatus, Adams and White, 'Samarang' Crustacea, p. 54, pl. vi. fig. 1 (1850): Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 307, and Cat. Leucos. Brit. Mus. p. 19: A. Milne-Edwards, Ann. Soc. Ent. Franc. (4) V. 1865, p. 151: Miers, Zool. H. M. S. 'Alert,' pp. 185, 254: A. O. Walker, Journ. Linn. Soc., Zool., XX. 1890, p. 111.

Carapace with three caverns, diminishing in size from before backwards, excavated just inside the front and lateral margins on either side. The caverns have undermined edges, and the first communicates with the second by a tunnel, while the second may sometimes (young) have an open communication with the third, and sometimes (adults) only the remains of a communication.

The intestinal region and the true posterior margin are insulated from the rest of the carapace by an undermined channel, which sends forwards a short branch on either side of the cardiac region. The

branchial regions are remarkably tumid, and their surface, like that of the non-excavated parts of the carapace, is reticulate-punctate: the floors of the caverns are either smooth or granular; the floor of the channel has bead-like granules scattered over it.

The whole under surface of the body is rough and granular.

The chelipeds are not quite $1\frac{1}{2}$ times the length of the carapace, and are nodular and granular: the hand is rather broader than long, and not much more than half the length of the fingers: along the outer surface of both fingers is a row of pits. The legs are slender, and are covered up to the tips of the dactyli with crisp, clavate, spiniform, or arborescent granules.

An adult (ovigerous) female has the carapace nearly 11 millim. long, and 14 millim. broad.

In the Indian Museum are 12 females and a young male from off Ceylon, 34 fms., off the Malabar coast, 28 fms., and from the Persian Gulf.

The abdomen of the young male is sunk below the level of the sternum.

18a. *Oreophorus reticulatus*, var. *alcicornis*, nov.

Differs from the common form in the following particulars:—

(1) The caverns are much larger, the two just behind the front being separated by a very narrow bridge.

(2) On either branchial region are three coarse spines—one on the summit and two on the lateral border: the spine on the summit is vertical and has a bifid tip.

(3) The eyes are not at all visible in a dorsal view.

A single adult female from off the Ganjam Coast, 28 fms.

Carapace 14 millim. long, 19 millim. broad.

Tlos, Adams and White.

Tlos, Adams and White, 'Samarang' Crustacea, p. 57.

Tlos, A. Milne-Edwards, Nouv. Archiv. du Mus. X. 1874, p. 51.

Tlos differs from *Oreophorus* chiefly in having the anterior and lateral parts of the carapace flat and the margin of the carapace turned up, so that although the cardiac and parts of the branchial regions are convex, the carapace as a whole is cupped. This is in marked contrast with the inflated form of *Oreophorus*, and constitutes the only difference between the two forms.

19. *Tlos petræus*, A. Milne-Edwards.

Tlos petræus, A. Milne-Edwards, Nouv. Archiv. du Mus. X. 1874, p. 51, pl. iii. fig. 1.

Carapace broadly pentagonal; with the front somewhat produced, bluntly triangular, and slightly emarginate. The margins of the carapace are thickened, roughened, and somewhat upturned. Each wing of the carapace shows a division into three broad lobes, but the divisions are only sutures, not gaps. Except for a ridge running from the front to the cardiac region, and except for a granular node just external to the cardiac region on either side and for a little thickening between each node and the postero-lateral angle, the surface of the carapace is smooth and concave. The under surface of the body is granular. The orbits are almost ventral in position, and the eyes are not visible in a dorsal view.

The chelipeds in the female are not quite as long as the carapace: the arm is trigonal with enlarged granules along all its borders, the wrist and hand are rough, and the dactylus is fluted. The hand is as broad as long, and is continued without any sort of constriction into the great shovel-shaped immobile finger, which is about as long as the hand and vastly more massive than the dactylus. The legs are compressed, and have their dorsal and ventral surfaces granular: in flexion they are hidden beneath the wings of the carapace.

In the abdomen of the male the terga although a good deal fused are all separately recognizable, and there is a denticle in the middle line on the 4th and 6th.

An adult (ovigerous) female has the carapace 7 millim. long, and 10 millim. broad.

Andamans, Off Ceylon 34 fms., Pedro Shoal 20 fms. Eight specimens.

20. *Tlos patella*, n. sp. Plate VIII. fig. 4.

Carapace transversely oval, and closely covered with granules which under the lens are fungiform: the carapace is traversed by a longitudinal ridge, and the branchial regions are convex in their posterior part; but the wings of the carapace are cupped dorsally, much as in *T. petræus*, and are divided by closed sutures into three broad lobes.

The front hardly breaks beyond the general outline of the carapace, and has its edge thickened. The eyes can just be seen in a dorsal view.

The intestinal region is convex backwards, and the bilobed (true) posterior margin still more so.

The under surface of the body is granular, much like the upper surface.

The chelipeds in the female are about one-fourth longer than the carapace, and are closely covered with small flat smooth granules: the arm is trigonal, with larger granules along the edges: the hand is somewhat inflated, a little longer than broad, and not much more than half the length of the fingers: the fingers are curved and are hollowed on the inner face: the immobile finger is distinctly constricted off from the hand, and is not vastly more massive than the mobile finger.

The legs are as in *T. petræus*.

The largest adult (ovigerous) female has the carapace 9 millim. long and 11 millim. broad.

Loc. Andamans. Seven females.

Heteronucia, n. gen.

Carapace strongly convex, broader than long, its surface both granular and tubercular (or coarsely spinous): the regions distinct.

Front bidentate, sunk behind the edge of the mouth-parts and of the puffed out pterygostomian regions.

Orbits complete but shallow, not concealing the rather large eyes in flexion. The basal antennal joint is fused with the orbit and with the front, and the extremely minute antennary flagellum is entirely inside the orbital wall. The antennules fold obliquely.

The epistome is exceptionally broad.

The external maxillipeds completely close the buccal cavern; the exopodite is narrow, with the outer edge straight; the merus is about two-thirds the length of the ischium measured along the inner border.

The chelipeds are massive and are about half again as long as the carapace: the hand is short, broad and swollen: fingers a good deal longer than the hand, stout, closely meeting throughout their extent, curved and concave on their inner face, opening vertically: the immobile finger is a good deal more massive than the dactylus.

Legs stout, the meropodites slightly hidden in flexion.

This species has, at first sight, a general resemblance to *Nucia speciosa*, but is at once distinguished by the form of the orbits, antennæ and chelipeds.

21. *Heteronucia vesiculosa*, n. sp. Plate VIII. fig. 1.

The whole surface of the body and of the appendages (except the fingers and dactyli) is covered with crowded vesiculous granules without any space between them.

Carapace a good deal broader than long, strongly convex: on either lateral margin are eight coarse spines or acute tubercles, the first of which is at the antero-external angle of the buccal cavern, the last of which is at the junction with the posterior border: in addition the

whole dorsum of the carapace is occupied by a "pyramid" (as on the billiard table) of 8 or 9 similar coarse spines or acute tubercles—the apex of the pyramid being on the intestinal region—and there is, further, a coarse denticle on either hepatic region: the surface of all these is densely vesiculous.

The front is broadly bidentate, and the whole of the front edge of the buccal cavern and of the tips of the external maxillipeds can be seen beyond it in a dorsal view. There is a tubercle near the base of the distal piece of the exognath.

The chelipeds are stout, and are rather more than half again as long as the carapace: the hand is subglobular: the fingers are somewhat longer than the hand, are elegantly grooved, meet in all their extent, open nearly vertically, and are hollowed and curved inwards; the dactylus is less massive than the immobile finger: at the base of the dactylus, on the upper surface of the hand is a small tubercle.

The abdomen of the female consists of 4 pieces—the 3rd to 5th terga being fused.

Colours in spirit light orange yellow.

An ovigerous female has the carapace 5 millim. long and 6 millim. broad.

Loc. Off Ceylon, 34 fms.

Nursia, Leach.

Nursia, Leach, Zool. Miscell. III. p. 18.

Nursia, Milne-Edwards, Hist. Nat. Crust. II. 137.

Nursia, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 307, and Cat. Leucos. Brit. Mus. p. 19.

Carapace with a broad, usually depressed, symmetrically-wrinkled surface, and with expanded, foliaceous, sinuous, scalloped, or jagged lateral and posterior margins,—the lateral margins somewhat concealing the true legs in flexion. Front projecting beyond the epistome and usually well beyond the eyes.

Orbits with two sutures in the roof, and a gap at the inner canthus, and with the upper-outer wall so emarginate as to leave the fully-retracted eye exposed to dorsal view.

Antennules folding obliquely. Antennæ, minute, situated in the inner canthus of the orbit.

Buccal cavern about as long as it is broad at base, and somewhat narrowed anteriorly; the exognath not dilated, its outer edge a little curved: the triangular merus is a little over half the length of the ischium, measured along the inner edge.

The chelipeds relatively to the legs are very massive: in the male they vary from $1\frac{1}{2}$ times to over twice the length of the carapace:

arms sharply trigonal; hands a good deal compressed; fingers stout and compressed, about half or two-thirds the length of the hand.

The abdomen of the male consists, usually, of 3 pieces, that of the female of 4.

Key to the Indian species of Nursia.

- I. An oblique ridge crossing either hepatic region, in addition to the longitudinal, transverse, and epibranchial ridges: upper surface of hand convex, but without a conspicuous median ridge:—
 1. The posterior margin of the carapace has the form of two blunt semicircular lobes: the lateral margins are sinuous, or only bluntly jagged: chelipeds in the adult male less than twice the length of the carapace:—
 - i. Lateral margins jagged: front with a coarse thickened granular edge, and not projecting much beyond the eyes: carapace much broader than long... ... *N. plicata.*
 - ii. Lateral margins sinuous: front in the form of a large ovate snout, projecting far beyond the eyes: carapace nearly as long as broad:—
 - a. Outer surface of wrist and hand bluntly and inconspicuously carinate: ridges of carapace coarse and granular: snout semicircularly rounded ... *N. blanfordi.*
 - b. Outer surface of wrist and hand sharply and conspicuously cristate: ridges of carapace clean-cut: snout ovate-pointed *N. nasuta.*
 2. The posterior margin of the carapace has the form of two sharp laminar teeth: the lateral margins are sharply jagged: front sharply 4-denticulate:

chelipeds, in the adult male, more than twice the length of the carapace

N. hardwickii.

- II. No trace of an oblique ridge on the hepatic regions or of a transverse ridge behind the branchial regions, the longitudinal and epi-branchial ridges alone present: posterior margin not manifestly bilobed: upper surface of hand traversed from base to finger-cleft by a distinct ridge:—

1. Carapace convex: front broadly bi-dentate *N. persica*.

2. Carapace almost laminar: front broadly pointed *N. abbreviata*.

- III. No ridges at all on the carapace: margins not manifestly sinuous *N. rubifera*.

22. *Nursia plicata*, (Herbst) *nec auctorum*.

Cancer plicatus, Herbst, Krabben III. iv. 2, pl. lix. fig. 2.

Carapace about three-quarters as long as broad, with the posterior margin in the form of two semi-circular dorsally-concave lobes. The foliaceous lateral margins are scalloped, each into four blunt teeth: in front of the first of these (which is rounded off), on either side, is a thickened marginal nodule; and the last, on either side, are united by a coarse granular ridge running across the carapace parallel with the posterior margin, which it cuts off from the rest of the carapace. This ridge culminates, in the middle line, in a coarse granular tubercle.

The middle of the carapace forms a coarsely-granular eminence surmounted by 3 tubercles in a triangle. From it six blunt coarsely-granular ridges radiate, as follows:—one forwards, in the middle line, to the front; one backwards, in the middle line, to the transverse ridge; one obliquely forwards, across the hepatic region on either side, to the nodule on the hepatic margin; and one obliquely backwards to the penultimate lateral tooth on either side. The spaces between the ridges are markedly concave, and are usually smooth.

The front hardly projects beyond the eyes, and has a coarse thickened granular edge: it is usually obscurely bilobed, and never quadridentate.

The surfaces of the external maxillipeds, of the pterygostomian regions, of the thoracic sterna, and of the proximal part of the male abdomen are distinctly granular.

The chelipeds in the adult male are $1\frac{3}{4}$ times, in the adult female about $1\frac{1}{4}$ times the length of the carapace: the arm has only its outer border

carinate,—the carina being coarse and granular; the base of its upper surface, the inner border, and the base of the under surface and the under border are also granular to the naked eye: the outer edges of the wrist and hand are coarsely and inconspicuously carinate: the fingers are stout, are rather strongly bent inwards, and have the opposed edges almost edentulous: *the dactylus is more than three-quarters the length of the outer border of the hand*, in both sexes.

The true legs are not much longer than the arm, and are compressed: in all the merus and propodite are sharply carinate dorsally and ventrally, the carpus has two sharp dorsal crests, and the dactylus is closely pubescent.

The abdomen of the male consists of two linear basal pieces and a small triangular apical piece, and between the two a long triangular plate with a median sub-terminal tooth.

Length of carapace of the largest male, 15 millim., breadth 20 millim.: length of carapace of largest female 16 millim., breadth 22 millim.

Old spirit specimens are uniform flesh-colour: but fresh spirit specimens are a bright brick red, with the wings of the carapace, and a medium longitudinal band including the front, yellowish white.

In the Indian Museum are 8 adult males, 6 adult and egg-laden females, and one young, from the Orissa Coast, Tinnevely coast, Palk Straits, Bombay, Karáchi, and the Persian Gulf. [Besides these there are 4 adult females and a male from Hongkong].

23. *Nursia hardwickii*, Leach.

Nursia hardwickii, Leach, Zool. Miscell. III., p. 20: Desmarest, Consid. Crust. p. 163: Milne-Edwards, Hist. Nat. Crust. II. 137.

Nursia plicata, Bell, Trans. Linn. Soc. Vol. XXI. 1855. p. 307, pl. xxxiv. fig. 4, and Cat. Lencos. Brit. Mus., p. 19 (*nec* Herbst): Stimpson, Proc. Ac. Nat. Sci. Philad. 1858. p. 161 (?): Miers, Trans. Linn. Soc., Zool., (2) I. p. 240, pl. xxxviii. fig. 28: Haswell, Cat. Austral. Crust. p. 127 (?): de Man, Notes Leyden Mus. III. 1881, p. 129: A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. p. 111 (?): J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 404.

The general form is that of *N. plicata* Herbst, but much finer and cleaner cut; and with the anterior part of the carapace narrower and the front projecting.

The posterior margin of the carapace has the form of two sharp-cut laminar teeth; and the three last teeth on either lateral margin are thin and sharp.

The crests on the carapace are thin and sharp, and very finely granular; and the elevation from which they radiate is defined by three sharp denticles: the transverse ridge that unites the two last marginal teeth across the carapace culminates, in the middle line, in a denticle.

The front distinctly projects beyond the eyes; its margin is thin and sharp and is cut into four teeth: the antero-lateral margins do not run up to the level of the tip of the front, involving the orbits, as they do in *N. plicata*.

The granulation on the ventral surfaces, unlike that of *N. plicata*, is hardly visible to the naked eye.

The chelipeds in the adult male are $2\frac{1}{3}$ times, in not-quite-half-grown males $1\frac{7}{8}$ times, and in adult females $1\frac{1}{2}$ times the length of the carapace: to the naked eye they are perfectly smooth: the outer edges of the arm, wrist and hand are sharply carinate: the dactylus in the male is little more than half the length of the outer edge of the hand.

Uniform flesh-colour in spirit.

Length of carapace in the adult male 14 to 15 millim., breadth about 19 millim.; in the adult female length 12 to 13 millim., breadth about 16 millim.

In the Indian Museum collection are 18 adult males, 8 adult females, and 2 young males taken at various places along the Coromandel coast, from Ganjam to Pondicherry.

24. *Nursia blanfordi*, n. sp. Plate VII. fig. 5.

Carapace, except that it is nearly as long as broad, of the same general appearance as in *N. plicata*, Herbst, with the same two semi-circular lobes on the posterior margin, and the same number of blunt teeth on the lateral margin,—the teeth, however, being blunter, and the first two on either side nearly confluent.

The ridges that radiate from the centre of the carapace, though of the same coarse and coarsely-granular form as in *N. plicata*, differ somewhat in arrangement: the median longitudinal ridge, the ridges that run obliquely outwards to the hepatic margin on either side, and the transverse ridge that unites the last lateral teeth across the carapace, are the same; but the epibranchial ridges that run to the penultimate lateral tooth on either side are so little oblique in the greater part of their extent as to form an almost transverse crest across the carapace, parallel with the first-mentioned transverse ridge and with the posterior margin. The triangle of denticles on the mid-gastric region, and the denticle on the second transverse crest are as distinct and sharp, especially in the male, as they are in *N. hardwickii*.

The front has the form of a semi-circular foliaceous snout, projecting far beyond the eyes, and somewhat recurved upwards.

Both the exopodite and the endopodite of the external maxillipeds are traversed longitudinally by a raised line of enlarged granules.

The chelipeds in the male are about $1\frac{3}{4}$ times, in the female about 187

$1\frac{1}{3}$ times, the length of the carapace, and their surface is everywhere finely granular, except on the fingers, which are of the same form and proportions as in *N. plicata*: the arm is trigonal, with all the edges sharp, and the outer edges of the wrist and hand are coarsely, but distinctly, carinate.

The legs have the merus, carpus and propodite faintly carinate dorsally.

The abdomen of the male consists of 3 pieces, the large middle piece having a subterminal denticle.

Colours in spirit, uniform light brownish.

The ovigerous female has the carapace 8 millim. long and 8.5 millim. broad: the male is slightly smaller.

Persian Gulf, 52 fathoms, dredged by Mr. W. T. Blanford, F. R. S., to whom the Indian Museum collections owe so many valuable additions. Also from the Mekran coast. Six specimens are in the Indian Museum.

25. *Nursia nasuta*, n. sp. Plate VII. fig. 6.

Resembles *N. blanfordi* in almost all its characters, especially in having the carapace nearly as long as broad, and the front in the form of a large curved foliaceous snout; but differs in the following particulars:—

(1) the front is sharper and even longer, and in shape is pointed-ovate:

(2) the ridges of the carapace are little granular, and the oblique ridges that cross the hepatic regions are obsolescent:

(3) the outer edge of the wrist and of the hand are raised each into a thin sharp high crest:

(4) the size is even more minute, the largest specimens (ovigerous females) having the carapace from 5 to 6 millim. long and from 5.25 to 6.25 millim. broad.

Loc. Off the Malabar coast, 28 fathoms. Two adult males and 6 adult females.

26. *Nursia persica*, n. sp. Plate VII. fig. 7.

Carapace about nine-tenths as long as broad, its lateral margins expanded and cristiform, but not scalloped, only sinuous (much as in *N. abbreviata*), forming three shallow lobules on either side: posterior margin laminar, perfectly straight, with a spot of dark red (in spirit) pigment in the middle line.

The carapace, which is rather strongly convex, is traversed longitudinally, in the middle line, by a broad sharp-edged ridge that ends

at a tubercle in the intestinal region, and is again crossed transversely by a similar ridge, which is strongly convex forwards: these are the only ridges on the carapace.

The front has the form of two broad sharp-cut teeth which are prominent beyond the eyes.

The outer margins both of the endopodite and of the exopodite of the external maxillipeds are granular and somewhat raised.

The exposed surfaces of the thoracic sterna, and of the carapace round the bases of the chelipeds, are covered with large granules (in the female—male unknown).

The chelipeds in the female are very little longer than the carapace: the arm is sharply trigonal, with the edges coarsely granular: the wrist and hand have the upper surface rough: the edges of the hand are sharp, and the upper surface of the hand is traversed, from its base to the finger-cleft, by a sharp finely-beaded ridge, as in *N. abbreviata*: the fingers (in the female) are about two-thirds as long as the hand, and are finely denticulate.

The legs are slender and compressed, with the merus, carpus and propodite sharply carinate dorsally.

Colours in spirit: mottled like Castile soap.

Length of carapace 9 millim., breadth 10.5 millim.

A single ovigerous female from the Persian Gulf.

This species well illustrates the close relation between *Nursia* and *Tlos*.

27. *Nursia abbreviata*, Bell.

Nursia abbreviata, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 308, pl. xxxiv. fig. 5, and Cat. Leucos. Brit. Mus. p. 20: Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 404.

Carapace about eight-ninths as long as broad, abnormally depressed—almost laminar—except in the mid-gastric region, which is somewhat angularly elevated: its borders, behind the front, are thin, foliaceously expanded and sinuous, forming 7 shallow lobules, the least distinct of which is the posterior border, which again is very inconspicuously subdivided by a faint emargination in the middle line: the whole of the free edge of the carapace is finely beaded, and slightly upturned, so as to emphasize the depressed appearance of the carapace.

An anteriorly-convex milled carina crosses the carapace from one lateral margin to the other, and is met in the middle line by a milled ridge running from the front: these are the only ridges on the carapace. There is granular elevation in the cardiac region, otherwise the carapace is smooth. The front is broad and prominent with the edge a little convex.

The pterygostomian region is traversed by a sharp ridge that runs parallel with the antero-lateral border.

The external maxillipeds, the edge of the sternum, and the entire edge of the fossa that receives the abdomen, are ornamented with beadlike granules, in the male.

The chelipeds in the male are a little more than half again as long as the carapace and in the female are not one-fourth longer than the carapace: the arm is sharply trigonal, with all the edges granular and the surfaces smooth: the upper surface of the wrist and hand are traversed, up to the finger cleft, by a sharply-raised beaded ridge: the fingers are about two-thirds the length of the hand, and meet only at tip.

The abdomen of the male consists of three pieces, the long middle piece having a sub-terminal denticle.

Colours in spirit: yellowish-brown mottled with greenish-brown, which on the arm, on the base of the hand, on the base of the fingers, and on the legs, forms cross-bands.

Eight males and five adult females, from Karáchi, the carapace of the largest male and female being 9 millim. long, and 10 millim. broad. Three very young specimens from the Coromandel coast are almost certainly this species.

28. *Nursia rubifera*, Müller.

Nursia rubifera, Müller, Verhandl. Naturforsch. Ges. Basel, VIII. 1886, p. 480, pl. iv. figs. 4, 4a, 4b.

Carapace broader than long, outline oval,—very inconspicuously polyhedral, edge cockled and finely granular. Front prominent, *bilobed*. Two isolated granular tubercles in the middle line—one in the gastric, one (smaller) in the cardiac region; but *no ridges*. Outer border of exognath strongly curved. Chelipeds in the male about half again as long as the carapace: arm sharply trigonal, with all three edges granular: a sharp longitudinal ridge on upper surface of hand: fingers meeting throughout their extent.

Irregular lilac stripes on the carapace and cross-bands on legs.

Loc. Trincomalee.

Not in the Indian Museum collection. Known here only from Müller's description and figures.

The species, as Müller says, is nearest allied to *N. abbreviata*, and is also closely related to *N. persica*.

Ebalia, Leach.

Ebalia, Leach, Malac. Pod. Brit. text of pl. xxv. and Zool. Miscell. III. p. 18.

Ebalia, Milne Edwards, Hist. Nat. Crust. 11. 128.

Ebalia, Bell, Brit. Stalk-eyed Crust. p. 139, and Trans. Linn. Soc. Vol. XXI. 1855, p. 303, and Cat. Leucos. Brit. Mus. p. 16.

Ebalia, Miers 'Challenger' Brachyura p. 303 (part).

Carapace rhomboidal or pentagonal or hexagonal; commonly, but not always, a little broader than long; its regions generally well defined and tumid, the tumid portions nodular or granular: its posterior margin is generally a little prominent and either bilobed, or with its extreme ends dentiform.

The front is not much produced in Indian species, except in *Ebalia* (*Phlyxia*) *erosa*.

In the orbital wall, as usual, there are three sutures, and a gap at the inner canthus: the edge of the roof of the orbit is considerably emarginate. The antennules fold obliquely or nearly transversely. The antennæ are minute but distinct.

The buccal cavern is moderately elongate: the exopodite of the external maxillipeds is not dilated, its outer edge is a little curved: the triangular merus of the external maxillipeds is about $\frac{3}{4}$ the length of the ischium measured along the inner border.

The chelipeds are variable: they are usually massive. In the typical *Ebalia* forms they are short—not much more than half again as long as the carapace—and stout, with short broad hands not much differing in length from the stout compressed fingers.

The abdomen of the male consists of 3 or 4 pieces.

Key to the Indian species of Ebalia.

- I. Front much produced: carapace markedly longer than broad *E. erosa*.
- II. Front not produced: carapace either a little broader than long or a very little longer than broad:—
 1. Edge of buccal cavern projecting a little beyond the front: posterior border of the carapace with three rounded teeth in the male and two (much less distinct) in the female: a large granular "broad arrow" on the carapace the ends of the wings of which project beyond the postero-lateral margin... *E. sagittifera*.
 2. Edge of front projecting beyond the epistome: ends of posterior margin thickened and obscurely dentiform.

- i. Dorsum of carapace deeply and very elegantly trilobed longitudinally..... *E. diadumena*.
- ii. Carapace hexagonal, dorsum with 4 granular swellings arranged in a "cross"... *E. wood-masoni*.

I have not included the species referred to by Dr. Henderson as *Ebalia pfefferi* and *Ebalia fallax* in this key, because the first appears to belong to Dana's genus *Nucia*, which in my opinion has no close affinity with Leach's genus, while the second is quite clearly a form belonging to the *Ilia* alliance, as it has the *Ilia* fingers hands and external maxillipeds.

29. *Ebalia diadumena*, n. sp. Plate VII. fig. 4.

Carapace rhomboidal, a little broader than long, its dorsal surface divided into three tumid crisply granular and most elegantly shaped lobes (a gastro-cardiaco-intestinal and two branchial—forming a sort of *fleur de lys*) by two extremely deep smooth longitudinal furrows. On the middle lobe the gastric and cardiac regions are separated by a shallow groove, and the cardiac and intestinal by a deep furrow. The hepatic regions are also distinctly circumscribed, but are altogether on a much lower plane than the rest of the carapace, and like the front are only indistinctly granular.

The front is divided, from its hardly emarginate edge down to the gastric region, by a narrow deepish longitudinal groove. Behind the front the angular pterygostomial ridge is somewhat prominent. The lateral margins are finely crenulate: the posterior margin is almost straight, with the ends somewhat dentiform.

The surfaces of both branches of the external maxillipeds are tumid and granular.

The chelipeds in the female (male unknown) are not very much longer than the carapace: the arm is trigonal and the greater part of all its surfaces is crisply granular, as also are large parts of the surfaces of the wrists and hands: the fingers are not much shorter than the hand and are elegantly striate-granular: the hand is not very much longer than broad.

The carapace of the adult female is 4 millim. long and 4.5 millim. broad.

A single ovigerous female from Palk Straits.

Colours in spirit lilac brown, the furrows on the carapace dark violet brown.

30. *Ebalia woodmasoni*, n. sp. Plate VII. fig. 3.

Carapace sharply hexagonal, its length just exceeds its breadth in the male, its breadth is equal to its length in the female.

Four large well-defined (especially in the male) granule-capped swellings or tubercles mark, respectively, the cardiac, intestinal, and branchial regions, and two small indistinct swellings mark the hepatic regions: the hollows between the larger swellings are elegantly punctulate.

Antero-lateral borders finely and inconspicuously, postero-lateral and posterior borders finely and distinctly beaded; the posterior border prominent and straight, with its ends more prominent—giving it a bilobed appearance.

Front angularly emarginate or broadly bidentate. Eyes rather large and not well concealed by the orbits.

Exposed parts of sternum granular, the first segment, in the male, with a strong longitudinal ridge or boss near the base of either cheliped.

Chelipeds in both sexes half again as long as the carapace: arm trigonal, its upper surface with some rows of enlarged beadlike granules along both borders, its under surface with a broad tapering band of similar granules: hand nearly twice as long as broad, and from $\frac{1}{4}$ to $\frac{1}{3}$ longer than the fingers.

Abdomen of male with a very strong terminal tooth on its penultimate segment.

In the male the carapace is 5 millim. long and 4.8 millim. broad, in the adult female it is 5 millim. in both dimensions.

Loc. Andamans.

This species appears to be near *Ebalia quadrata*, A. M.-E., from Bass' Straits, and to Miers' *Ebalia rhomboidalis*, *minor* and *bituberculata*, from Japan.

31. *Ebalia sagittifera*, n. sp.

Carapace hexagonal, although hardly longer than broad yet of an elongate appearance, owing to the unusual length and very gradual convergence of the postero-lateral borders: the whole antero-lateral margin is sharp, slightly curled and elegantly striated or milled: the edge of the subhepatic regions, or pterygostomian ridges, are extremely prominent, standing out on either side like a pair of little wings. In the male the posterior margin bears a petaloid tubercle at either end and a denticle in the middle line: in the adult female the lateral tubercles are indistinct and the median tubercle absent.

The front is emarginate, and part of the edge of the buccal cavern can be seen beyond it in a dorsal view.

On the carapace are three broad granular ribs which unite to form a "broad-arrow," point forwards: the middle ridge begins about the middle of the gastric and ends in the middle of the intestinal region, the lateral ribs run obliquely backwards and outwards, parallel with the antero-lateral margins, across the branchial regions, their ends projecting well beyond the postero-lateral borders in the male, but not so much in the female.

The chelipeds are about half again as long as the carapace: the arm is trigonal with the edges raised and granular: the wrist and hand have a raised row of granules along the inner edge of their upper surface: the hand is about two-thirds as broad as long, and the fingers are about two-thirds the length of the hand.

The abdomen of the male consists of only two pieces, and is without a denticle.

Colours in spirit: mottled dark green and greenish brown, legs and chelipeds with black-speckled cross-bands.

Length of carapace of male 5 millim. long, 4.5 millim. broad; of ovigerous female 6 millim. long, 5.75 millim. broad.

Loc. Karachi.

As in *Ebalia erosa* the space between the lower edge of the orbit and the edge of the buccal frame is much reduced. This species appears to be closely related to *Ebalia hypsilon*, Ortmann, in Semon's Zool. Forschungsreisen Austral. u. Malay. Arch., Crust. p. 36, pl. ii. fig. 7.

32. *Ebalia erosa*, (A. Milne Edwards).

Phlyxia erosa, A. Milne Edwards, Journ. Mus. Godeff. I. iv. 1873, p. 262, and Nouv. Archiv. du Mus. X. p. 47, pl. iii. fig. 2: Haswell, P. L. S. N. S. Wales, IV. 1879, p. 54, and Cat. Austral. Crust. p. 125: Miers, P. Z. S. 1884, pp. 10, 13.

Ebalia erosa, Miers, 'Challenger' Brachyura p. 305: Ortmann, Zool. Jahrbuch. Syst., etc., VI. 1892, p. 580.

Carapace longer than broad, somewhat piriform, with a produced narrow bidentate front from which a prominent ridge runs straight back to the cardiac region, with the hepatic and subhepatic regions angularly prominent, and with three dentiform projections—one of which is the acuminate tip of the tumid intestinal region—on the prominent posterior margin. On the posterior half of the carapace there are some large symmetrically disposed tubercles, usually about 9 in number (3 on either branchial region and 3 on the cardiac region) and sometimes more or less confluent: the three on the cardiac region are always very distinct and are so connected as to form an elegant V, or with the ridge from the front an "anchor," and however much the branchial tubercles may be confluent one on either side of the V is

always enlarged and acuminate. The tubercles, the tumid intestinal region, and sometimes also the intervening hollows, are crisply granular.

The buccal cavern is elongate.

The chelipeds in both sexes are little longer than the carapace, and are rather slender: they are finely granular, especially the arms. The hand is a little broader at its proximal than at its distal end, where it is about half as long as broad: the fingers are little more than half the length of the hand.

Colours in spirit ivory white.

The carapace of the male is about 6 millim. long and 5 millim. broad: that of the adult female is 9 millim. long and 7 millim. broad.

Numerous specimens are in the Indian Museum, from the Maldives and Andamans.

Nucia, Dana.

Nucia, Dana, U. S. Expl. Exped., Crust. pt. I. p. 397.

Nucia, Bell, Cat. Leucos. Brit. Mus. p. 24.

Carapace strongly convex, broad, transversely somewhat ovoidal in shape, its surface uneven and densely covered with vesiculous or pustulose granules, and with the regions usually well demarcated.

The front is narrow, broadly bidentate, and somewhat sunk behind the level of the front edge of the buccal cavern. The pterygostomial regions are puffed out so as to increase the squat and sunken appearance of the front. There is a remarkably broad interval between the orbits and the edge of the buccal cavern.

The eyes are large, and the orbits have the upper edge deeply emarginate so that the retracted eye is hardly at all concealed. The antennules fold obliquely, and the antennæ have the basal joint rather closely filling the gap at the inner canthus of the orbit and the flagellum small but distinct.

The buccal cavern is moderately elongate: the exognath is not dilated and has the outer border almost straight: the triangular merus of the endognath is not much shorter than the ischium measured along its inner edge.

The chelipeds are very short and stout: the legs also are remarkably stout.

In the Indian Museum Collection, the only representative of this genus is a male specimen of *Nucia speciosa*, Dana, from Upolu. This is, quite clearly, closely allied to the species named *Randallia pustulosa* and *Randallia lamellidentata* by Wood-Mason. [Whether these are really *Randallia* as defined by Stimpson it is difficult to say; but they are certainly congeneric with Miers' *Randallia granulata* ('Challenger' Brachyura, p. 317, pl. xxvi, fig. 1)].

33. *Nucia pfefferi*, (de Man).

Ebalia pfefferi, de Man, Archiv. für Naturges. LIII. 1887, i. p. 390, pl. xvii. fig. 4: Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 402.

As there seems to be some doubt whether this species is really distinct from *Nucia speciosa*, Dana, U. S. Expl. Exp. Crust. pt. I. p. 397, pl. xxv. fig. 5a I must here be content to give only the references. It is included in the Indian fauna on the authority of Dr. J. R. Henderson.

Randallia, Stimpson.

Randallia, Stimpson, Journal Boston Soc. Nat. Hist. Vol. VI. 1857, p. 471.

Randallia, Miers, 'Challenger' Brachyura, p. 316.

Carapace circular and convex, almost globular; with the front narrow, usually broadly bidentate, and somewhat sunk behind the level of the front edge of the buccal cavern. The subhepatic or pterygo-stomian regions are convex and puffed out, so as to increase the squat and sunken appearance of the front. There is a remarkably broad vertical interval between the orbits and the edge of the buccal cavern.

The surface of the carapace is, typically, covered with vesicular or pustulous granules, but these are sometimes visible only with a lens: the regions are usually, but not always, distinctly demarcated by grooves.

The posterior margin is generally, but not always, armed with spines or petaloid lobules or tubercles.

The orbits are almost as imperfect as they are in *Parilia*: their upper edge is deeply emarginate, there is a wide gap at the inner canthus, and there are three very distinct sutures, or sometimes actual fissures, in the upper-outer wall.

The antennules fold obliquely: in one Indian species their basal joint forms a close-fitting operculum to the antennulary fossa. The antennæ are very distinct, and are loosely lodged in the inner canthus of the orbits.

The buccal cavern is triangular and somewhat elongate: the exognath is not dilated and its outer margin is almost straight: the triangular merus of the endognath is about $\frac{2}{3}$ the length of the ischium measured along its inner edge.

Chelipeds either massive or moderately stout, of moderate length; fingers stout, about as long as the hand, which is not more—but is usually much less—than half the length of the carapace.

Although there is, as usual, some fusion among the abdominal terga, yet the sutures are never wholly obliterated as they are in most other Leucosines.

Key to the Indian species of Randallia.

- I. The basal joint of the antennules forms a close-fitting operculum to the antennulary fossa: the whole body and appendages are covered with a dense velvety pubescence: front very indistinctly emarginate *R. lanata.*
- II. The antennules fold loosely in their fossæ: body and appendages devoid of pubescence: front distinctly bidentate:—
 1. Carapace granulous or pustulous, the regions defined by grooves:—
 - i. Front separated from the carapace by a conspicuous transverse groove: intestinal region tumid but not culminating in a spine: tip of exognaths (and often of adjoining points) blister-like *R. pustulilabris.*
 - ii. No deep groove at the base of the front: intestinal region culminating in a spine, the tip of which overhangs the posterior margin of the carapace: end of exognaths sharp:—
 - (a) Chelipeds rather elongate and slender, twice the length of the carapace: hand subcylindrical and rather elongate: antero-lateral margins of carapace with simple tubercles or spines *R. pustulosa.*
 - (b) Chelipeds short and stout, less than twice the length of the carapace: hand short and stout, its outer border, like that of the fingers, very sharply cristiform: antero-lateral margins of carapace with laminiform teeth *R. lamellidentata.*
 2. Carapace smooth and polished to the naked eye, the regions not or hardly defined:—
 - i. Chelipeds rather elongate and slender, more than twice the length of the

carapace: three round laminiform lobes on the posterior margin of the carapace *R. eburnea*.

- ii. Chelipeds short and stout, less than twice the length of the carapace: posterior margin of carapace differing from that of all the other species in being quite smooth *R. glans*.

34. *Randallia lanata*, n. sp.

The whole of the body and its appendages covered with a close, short, light-coloured, velvety pubescence.

Carapace circular, globular, with all the regions well defined by grooves; its surface covered, beneath the pubescence, with rather distant pustulous granules. Behind the front all the margins of the denuded carapace are armed with blunt dentiform tubercles or granules. There is a not very distinct notch between the hepatic and branchial regions.

The front has an almost straight edge, and although it is for the genus rather prominent, the ends of the external maxillipeds can be seen beyond it in a dorsal view.

The orbits are so emarginate above as to afford little concealment to the retracted eye, which is rather large.

The antennules fold obliquely, their basal joint forming a close-fitting operculum to the antennulary fossæ.

The chelipeds are similar in both sexes, being stout and about half again as long as the carapace: the hand is very stout, is not much longer than broad, and is about one-third the length of the carapace: the fingers are stout and are about three-fourths the length of the hand. The legs are stoutish.

In both sexes all seven abdominal terga are plainly and independently recognizable though not all independently movable: in the female (even in the ovigerous adult) the abdomen is somewhat narrow.

In the adult male the carapace is 7 millim. long and 6.5 millim. broad, in the adult female it is 8.5 millim. in both diameters.

Andaman Sea usually at over 30 fathoms.

35. *Randallia pustulilabris*, n. sp.

Leucosilia granulosa, Alcock and Anderson, J. A. S. B. Vol. LXIII. pt. 2, 1894, p. 207, and Ill. Zool. Investigator, Crustacea, pl. xxiv. fig. 3 (*in the press*).

Carapace slightly broader than long, globular: truncated anteriorly,

so that the external maxillipeds are visible beyond the front: very densely covered, as are also the chelipeds, with bead-like granulations: the regions delimited by shallow yet distinct furrows. The rostrum consists of two divergent hollow lobes, the tips of which are curved slightly outwards, beneath which the antennules are lodged, as in the other species of this genus: *immediately behind the rostrum the carapace is traversed from side to side by a deep groove*. The antero-lateral margin is interrupted by a deep notch, in front of which is a coarse blunt hepatic tooth, while behind it is a stronger epibranchial tooth. The lateral angle is also marked by a prominent granule. The posterior margin is almost straight and bears three dentiform tubercles, of which the median is hardly conspicuous. The hepatic regions are inflated, as are also the sides of the gastric region. The intestinal region forms a tumid boss, on the summit of which the granulations are obsolescent.

The tips of both rami of the densely granular external maxillipeds are strongly bent upwards, as in all the other species of this genus, that of the exognath ending in a large blister-like tubercle. [Sometimes also the outer angles of the buccal cavern, the tips of the frontal teeth, and the edges of the orbit end in similar, but smaller, blister-like swellings].

The chelipeds in the male are a little less than twice the length of the carapace, and are stout: the fingers are stout, and are about as long as the hand, which is rather more than two-fifths the length of the carapace. Legs smooth: dactyli with a few hairs.

The 3rd to the 5th abdominal terga are fused in the male, but are independently recognizable, and the 6th has a terminal denticle—not very conspicuous: in the female the 3rd to the 6th are fused.

	Male.	Female.
Length of carapace.....	6·5 millim.	7·5 millim.
Breadth of carapace.....	7·0 millim.	9·0 millim.
Greatest span (of chelipeds).....	24·0 millim.	26·5 millim.

Besides being smaller, and having the chelipeds of slightly greater relative length, the male differs from the female in being much more sharply granular.

Numerous males and egg-laden females, from different parts of the Malabar Coast in 26–30 fathoms, from the North Maldivé Atoll in 15–30 fms., and from Mergui in 40 fms.

I have thought it justifiable to change the name of this species from *granulosa* to *pustulilabris*, as Miers, 'Challenger' *Brachyura* (1886) p. 317 has already used the very similar name *granulata* for a species belonging to this genus as here defined.

36. *Randallia glans*, n. sp.

Carapace globular, usually in the male smooth and polished to the naked eye though closely punctate-granular under the lens, in the female densely covered with vesicular granules that are often visible without any magnification: all its borders smooth and full, and except for a broad and shallow notch in the antero-lateral border, between the branchial and hepatic regions, its regions are not in any way defined.

Front narrow, broadly bidentate, the tips of the teeth somewhat produced and bent outwards: its base is separated from the rest of the carapace by an indistinct groove.

External maxillipeds smooth and polished to the naked eye in the male, somewhat more granular in the female—just like the carapace.

Chelipeds stout: in the male a little less than twice the length of the carapace, everywhere very densely granular, the granules being vesicular and being plainly visible without a lens on the arm at any rate: fingers stout, as long as the hand, which is between $\frac{1}{2}$ and $\frac{2}{3}$ the length of the carapace. Legs smooth: dactyli with a few hairs.

In the male the 3rd-5th abdominal terga are fused but are independently recognizable, and the 6th has a strong terminal denticle; in the female the 3rd-6th are fused.

The carapace of the adult male is 6 millim. in either diameter, that of the ovigerous female is 7.5 millim. long and 8 millim. broad.

Andaman Sea, about 50 fms.

This species is closely related to *R. pustulilabris*.

37. *Randallia lamellidentata*, Wood-Mason.

Randallia lamellidentata, Wood-Mason, Illustrations of the Zoology of the 'Investigator' Crustacea, pl. v. figs. 5, 5a, 5b: Alcock, Ann. Mag. Nat. Hist. May, 1894, p. 404.

Carapace rhomboidal with the angles rounded off—subcircular; its surface behind the front covered with unequal-sized rather scattered pustulous tubercles; its regions well defined by grooves of some depth.

Front bluntly bidentate. On the antero-lateral margin are three broad lamelliform teeth, the front one of which is on the pterygostomian ridge (which as usual forms the front part of the antero-lateral margin), and there is a fourth similar tooth at the junction of the antero-lateral and postero-lateral margins. The postero-lateral margins are full and the pustulous tubercles extend on to them.

The short posterior margin is elegantly bilobed, with a few pearly granules round the lobes, and is overhung by the tip of the horizontal spine in which the intestinal region culminates.

The ventral surface of the carapace, the thoracic sterna, abdominal

terga (in the male) and external maxillipeds are all granular, the granules above the base of the chelipeds being enlarged and pearly.

The chelipeds in the male are about two-thirds as long again as the carapace, and are massive and granular: at the distal end of the outer edge of the somewhat trigonal arm the granules are enlarged and almost spiniform, as are also one or two at the distal end of the outer surface of the wrist. The hand is not much longer than broad and hardly one-third the length of the carapace; its outer edge is in the form of a remarkably thin and deep crest: the fingers are stout and rather longer than the hand, their outer (non-opposed) edges are cristiform.

The legs are granular, the granules on the dorsum of the propodites carpopodites and distal end of the meropodites being spiniform, as also on the outer surface of the ischium and merus of the last pair: the dactyli are hairy.

The 3rd-6th abdominal terga of the male are fused but are all very distinctly and independently recognizable, the 6th has a terminal denticle.

The largest male, dredged in the Andaman Sea at 350 fms., has the carapace between 16 and 17 millim. long and 18 millim. broad (without spines).

38. *Randallia pustulosa*, Wood-Mason.

Randallia pustulosa, Wood-Mason, Ann. Mag. Nat. Hist. March, 1891, pp. 266 and 267, and Illustrations of the Zoology of the 'Investigator' Crustacea, pl. v. fig. 4.

Carapace subcircular, subspherical; covered with unequally large pustulous tubercles the surface of which, like the surface between them, is finely and closely granular under the lens; all the regions are well defined by broad grooves.

The front is narrow and broadly bidentate. The lateral margins are full and inflated, and carry in the adult a series of tubercles, in the young a series of blunt spines: in the antero-lateral margin, between the hepatic and branchial regions, is a conspicuous notch, which corresponds with a groove or depression in the pterygostomian face of the carapace.

The short posterior border has a spine or dentiform lobe at either end, and is overhung by the long spine in which the tumid intestinal region culminates.

The whole under surface is densely granular in the young male, but in the female the fused 4th-6th abdominal terga and the inner half of the ischium of the external maxillipeds are smooth.

The chelipeds in the adult female and young male (adult male unknown) are twice the length of the carapace and are everywhere

finely granular. The hand is subcylindrical and elongate, being half as long as the carapace; the fingers are stout and about as long as the hand, they are finely denticulate, with enlarged denticles at regular distant intervals.

The legs are stoutish and, to the naked eye, smooth: the dactyli are fringed with hairs.

In the (young) male the 3rd-6th abdominal terga are fused but without any obliteration of sutures: in the adult female the 4th-6th are fused and the sutures obliterated.

Carapace of an adult female about 31 millim. in either diameter.

Loc. Andaman Sea, 240-220 fms., and 250 fms., Laccadive Sea, 406 fms.

In the young the carapace is quite spherical, with its edges spiny and its surface closely and crisply granular—the young, in short, has a very strong general resemblance to the adult of *R. pustulilabris*.

In the adult female the brood-pouch communicates with the branchial chambers on either side by means of a foramen, as in *Parilia*.

39. *Randallia eburnea*, n. sp.

Carapace subcircular, convex, subspherical, perfectly smooth to the naked eye though closely covered with vesicular granules under the lens; its regions, except the intestinal, hardly defined.

The front is narrow, and is broadly bidentate; the edge of the buccal cavern is more prominent beyond it than in any of the other species. Between the convex subhepatic border and the branchial border is a broad notch: near the middle of the branchial border is a rounded deflexed tooth: the antero-lateral margin from the front to this tooth is finely denticulate.

The fissures in the outer wall of the orbit are very distinct.

The posterior margin is elegantly three lobed, the lateral lobes being broad and semicircular, the middle lobe being narrower: all three are laminar.

The external maxillipeds are granular and pubescent distally.

The chelipeds are longer and more slender than in any of the other species, being a little more than $2\frac{1}{2}$ times the length of the carapace: they are perfectly smooth to the naked eye though closely granular under the lens, the granules on the arms being vesicular. The hands are subcylindrical and about two-thirds the length of the carapace: the fingers are stout and between $\frac{2}{3}$ and $\frac{3}{4}$ the length of the hand, their opposed edges are finely denticulate, with enlarged denticles at regular intervals. Legs smooth, the dactyli with a few fine hairs at tip only.

Although the 3rd-5th abdominal terga are fused they are all three independently recognizable.

Carapace of (apparently adult) male 14 millim. in either diameter.

Loc. Off Laccadive Islands, 30 fms.

Parilia, Wood-Mason.

Parilia, Wood-Mason, Ann. Mag. Nat. Hist., March 1891, p. 264.

Carapace strongly convex, especially posteriorly, somewhat oval transversely, with three spines on the posterior margin; the surface finely granular, the regions fairly well-defined.

The front is narrow and bidentate, and the epistome projects well beyond it,—the epistome being, for an Oxystome, deep—as in *Randallia* and *Nucia*.

The eyes are small, and the orbits imperfect, for not only have they two fissures (not mere sutures) in the roof, and a broad fissure in the outer wall, and a broad gap communicating with the antennary and antennular fossæ, but their upper-outer wall is deeply emarginate.

The antennules fold a little obliquely. The antennæ are distinct, and stand in the gap at the inner canthus of the orbit, which they do not nearly fill.

The buccal cavern is considerably broader than long, owing to the enormous width of the afferent branchial channels and of the foliaceous expansion of the exopodite that covers them: the outer edge of the latter is strongly curved: the triangular merus of the endognath is very nearly as long as the ischium, measured along the inner edge.

The chelipeds in the adult male are several times the length of the carapace, and are slender, though more massive than the legs: the hands are several times the length of the stoutish fingers.

The abdomen in the male consists of five distinct pieces: in the female it consists of seven, but the 4th, 5th and 6th are not separately movable.

Branchial chambers greatly inflated, especially posteriorly: branchiæ large, and six in number on either side. [Brood-pouch of the female very large and communicating with the branchial chamber on either side, at base, by a foramen.]

40. *Parilia alcockii*, Wood-Mason.

Parilia alcockii, Wood-Mason, Ann. Mag. Nat. Hist., March 1891, p. 264, and Ill. Zool. 'Investigator,' Crust. pl. v. figs. 3, 3a ♀: Alcock and Anderson, J. A. S. B. Vol. LXIII. pt. 2, 1894, p. 177.

Carapace about seven-eighths as long as broad, transversely oval,

but with the anterior margin—between the outer angles of the afferent branchial channels—perfectly straight.

The antero-lateral margin is broadly indented at the junction of the hepatic and branchial regions, and bears four denticles; and there are three denticles on the posterior margin, the middle one of which is the smallest: just above the posterior margin is another transverse row of three denticles,—one in the middle of the intestinal region and one on the posterior wall of the branchial region on either side.

The carapace is strongly convex, the convexity gradually increasing from before backwards and then suddenly dropping, like a simian cranium, which in profile it much resembles: the surface is everywhere finely granular.

The regions of the carapace are well delimited by broad shallow grooves and lines of dimples, the branchial regions each forming an enormous tumid expanse. A slightly raised ridge traverses the carapace, in the middle line, from the base of the front to the intestinal denticle.

The front is broadly bilobed, each lobe being convex dorsally and acuminate: beyond it in a dorsal view is seen the epistome and the whole length of the edge of the buccal cavern.

The surface of the external maxillipeds and the ventral surface of the carapace are finely granular, but the sternum and the greater part of the abdomen are smooth. In the middle of the sternum of the female, between the genital openings, is an erect spine.

The external maxillipeds have a narrow triangular endopodite, the m \acute{e} rus of which is strongly curved upwards towards the front; and a foliaceous exopodite, which is much shorter than the endopodite, and which is semicircular in shape and two-thirds as broad as long—broader even than in *Philyra globosa*, Fabr.

The chelipeds as in *Myra fugax*, vary according to age and sex: in the adult male they are $4\frac{1}{2}$ times, in the female and young male $2\frac{1}{2}$ times, the length of the carapace, and are only about twice as massive as the legs: their surface up to nearly the end of the hand is finely scabrous. The arm is cylindrical: the hand in the female is cylindrical, but in the male somewhat clavate. The hand in the male is more than 3 times, in the female only twice the length of the fingers: the fingers are stout, gently curved in the female, somewhat sinuous in the adult male, and their opposed edges are almost edentulous.

The legs in the male are shorter than the arm; in the female they are a little longer than the arm: they are cylindrical, and finely scabrous on the dorsal surface: the dactyli are obtusely pointed, and have both their edges closely fringed with longish stiff hairs.

Colours in spirit rusty reddish.

The carapace of the average adult male is 50 millim. long and 56 millim. broad, of the adult female 40 millim. long and 48 millim. broad.

Fairly common on soft muddy bottoms along the east coast of India between 70 and 250 fathoms.

In the Indian Museum collection are 96 specimens of both sexes and all ages.

Myra, Leach.

Myra, Leach, Zool. Miscell. III. p. 23.

Myra, Milne-Edwards, Hist. Nat. Crust. II. 125.

Myra, Bell, Trans. Linn. Soc. Vol. XXI, 1855, p. 296, and Cat. Leucos. Brit. Mus. p. 12.

Myra, Miers, 'Challenger' Brachynura, p. 312.

? *Myropsis*, Stimpson, Bull. Mus. Comp. Zool. Vol. II. p. 156.

Carapace ovoid (or globular in *Myropsis* and in the young of most Indian species of *Myra*), terminating posteriorly in three spines,—two on, and one in the middle line immediately above, the posterior border. (But in *Myropsis* and in the young of several species of *Myra* there is a pair of additional spines,—one on either postero-lateral border just above the last pair of legs). The surface of the carapace is either smooth or granular, never nodular or eroded, and resembles that of *Leucosia* in not having all the regions demarcated, at any rate in the adult.

The front is well delimited from the carapace, and although the dentiform prolongations of the septa of the branchial channels may sometimes project beyond it, yet the whole of the edge of the buccal cavern is never in the adult seen beyond it in a dorsal view.

The hepatic region—the side-wall of which commonly forms a distinct facet—is generally separated from the branchial region by a broad notch in the antero-lateral margin, this being continuous with a depression in the pterygostomian face of the carapace and with a longitudinal groove in the side-wall of the carapace,—the whole foreshadowing the thoracic sinus of *Leucosia* (? in *Myropsis*).

The orbits are deep, and although the upper edge is a little emarginate, the retracted eye is completely concealed: the three sutures in the roof and outer wall are very distinct: as in *Leucosia* the floor practically coincides with the roof of the buccal cavern, as regards its edge at any rate.

The antennæ are loosely lodged in a gap at the inner canthus of the orbit. The antennules fold obliquely.

The buccal cavern is elongate: the acutely-triangular merus of

the external maxillipeds is not much more than half the length of the ischium measured along the inner edge: the 2nd segment of the exognath generally has the outer edge elegantly curved, but is not dilated except a little at the base.

The chelipeds though much more massive than the legs, and rather more massive than those of *Ilia*, *Arcania* and their immediate allies, are not nearly so massive as those of *Leucosia*, *Philyra*, etc. In some species at any rate they vary much in length according to age and sex, but they are seldom less, and are often more, than twice the length of the carapace. The fingers are stout and vary in length, being sometimes a little longer than, but in the adult males of one species only half the length of, the hand.

The abdomen of the male usually consists of 4 pieces, that of the female of 5.

The species of this genus are often difficult to discriminate owing to the changes that they undergo in growth. The following key will, it is believed, serve for the determination of adult forms.

Key to the Indian species of Myra.

I. Carapace broadly oval (longitudinally), with a broad notch in the antero-lateral margin between the hepatic and branchial regions:—

1. Side-wall of hepatic region forming a distinct facet, behind which the lateral margins of the carapace are defined by a beaded line: spines of the posterior margin more or less acute: fingers either shorter or hardly longer than the hand:—

i. Spines of the posterior margin long and acute: carapace finely granular—the granules hardly visible to the naked eye: chelipeds slender (in the adult male nearly thrice the length of the carapace): hand long (in the adult male often nearly twice the length of the fingers, and about two-thirds the length of the carapace) ... *M. fugax*.

ii. Spines of the posterior margin short, the middle one acute,

those on either side dentiform: carapace crisply granular, the granules of good size: chelipeds stoutish, not quite twice the length of the carapace even in the adult male: hand short:—

- a. Front not projecting beyond the dentiform ends of the walls of the branchial channels: hand about half length of carapace: fingers about two-thirds length of hand *M. affinis*.
 - b. Front shaped much as in *Leucosia*, projecting well beyond the free edge of the branchial channels: hand hardly two-fifths the length of the carapace: fingers as long as the hand *M. brevimana*.
- 2. Side wall of hepatic regions convex, not distinctly faceted in the adult: lateral margins of the carapace full, and not defined by any beaded line: armature of the posterior margin consisting of three petaloid lobules: fingers longer than the hand *M. darnleyensis*.
- [II. Carapace subcircular, with five marginal spines and spinules at its posterior end *M. pentacantha*.
(probably the young of *M. fugax*).
- III. Carapace narrowly and acutely oval (longitudinally) its shape recalling that of *Raninoides*, without any marked notch between the hepatic and branchial regions *M. elegans*.

41. *Myra fugax*, (Fabr.)

Cancellus anatum tertius, Rumph, Amboin. Rariteitk. I. 27, pl. x. fig. C.
Cancer punctatus, Herbst, Krabben, I. ii. 89, pl. ii. figs. 15, 16.

Leucosia fugax, Fabricius, Ent. Syst. Suppl. p. 351: Bosc, Hist. Nat. Crust. I. 236: Latreille, Hist. Nat. Crust. et Ins. VI. 119, pl. l. figs. 1, 2.

Myra fugax, Leach, Zool. Miscell. III. p. 24: Desmarest, Consid. Crust. p. 169, pl. xxviii. fig. 2: Milne Edwards, in Cuvier, Règne Animal, Crust. pl. xxv. fig. 3, and Hist. Nat. Crust. II. 126: De Haan, Faun. Japon. Crust. p. 134, pl. xxxiii. fig. 1: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 296, and Cat. Leucos. Brit. Mus. p. 12: Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 160: A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 45: Hilgendorf, MB. Ak. Berl. 1878, p. 811: E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 48 (*gastric teeth*): Richters, in Möbius Meeresf. Maurit. p. 157: Miers, P. Z. S. 1884, pp. 10, 13, and 'Challenger' Brachyura p. 313: [Cano, Boll. Soc. Nat. Napoli, III. 1889, p. 253]: Müller, Verh. Ges. Basel, VIII. 1886, p. 472: Ortmann, Zool. Jahrbuch., Syst., &c., VI. 1892, p. 581: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 402. (Adult).

Myra carinata, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 297, pl. xxxii. fig. 3, and Cat. Leucos. Brit. Mus. p. 13: Haswell, P. L. S., N. S. Wales, IV. 1879, p. 50, and Cat. Austral. Crust. p. 121: Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 316, and Zoology H. M. S. 'Alert' pp. 184, 250: Sluiter, Tijds. Nederl. Ind. XL. 1881, p. 160: Müller, Verh. Ges. Basel, VIII. 1886, p. 472: A. O. Walker, Journ. Linn. Soc., Zool., XX. p. 111. (Non-adult).

Myra coalita, Hilgendorf, MB. Ak. Berl. 1878, p. 812, pl. i. figs. 6 and 7: [Cano, Boll. Soc. Nat. Napol. III. 1889, p. 253]. (Non-adult).

Myra dubia, Miers, P. Z. S. 1879, pp. 20, 42.

Myra fugax, var. *coalita*, Ortmann, Zool. Jahrbuch., Syst., &c., VI. 1892, p. 582.

Carapace, in the adult, ovoidal, with 3 sharp, usually recurved, spines—one at either extremity of the posterior margin, and one very long one in the middle line just above the posterior margin. On the surface of the carapace are (1) some scattered punctiform granules, almost invisible to the naked eye in the adult (except on the basal half of the median posterior spine where they are always large and numerous), and (2) a longitudinal median carina, almost or quite obsolete in the adult. The regions of the carapace are not well defined.

The front is broadly bidentate, and is prominently convex dorsally, but projects so little beyond the edge of the buccal cavern that the spiniform angles of the branchial channels and the tips of the external maxillipeds can be seen beyond it in a dorsal view: it and the neighbouring parts are usually somewhat pubescent.

Behind the tip of the front the antero-lateral boundary of the carapace is formed by the obliquely-faceted side-wall of the sub-hepatic region, the facet being bounded above and below by beaded lines on both of which, near their posterior end, is a tubercle or tooth: the surface of the facet is quite smooth.

Behind the hepatic facet, between it and the branchial region, is a very well defined notch corresponding with a depression on the pterygostomian face, this again being in continuity with a well-cut longitudinal groove (quite independent of the epimeral suture) that traverses

the side-wall of the carapace just above the somewhat thickened epimeral edge,—the whole foreshadowing the thoracic sinus of *Leucosia*.

Behind this notch the lateral border of the carapace is defined by a finely beaded line, the first few beads being sometimes, in non-adults, somewhat dentiform.

The external maxillipeds are granular and hairy distally, and in the female are hairy all along their apposed edges.

The chelipeds vary a good deal according to age and sex, but are always rather slender. In the adult male they are from $2\frac{3}{4}$ to $3\frac{1}{4}$ times the length of the carapace (without spine), in the adult female a little over twice. The cylindrical arm has the proximal half to three-quarters closely covered on all but its under surface with enlarged vesicular granules. The hand though slightly broadened at base, is of an elongate rather slender form: in the adult male it is about $\frac{2}{3}$ the length of the carapace (without spine), in the adult female half or a little more than half. The fingers in the adult male are from $\frac{5}{8}$ to $\frac{1}{2}$, in the adult female about $\frac{2}{3}$, the length of the hand: they are gently curved, a little bent inwards, and somewhat slender, and their opposed edges meet throughout and are finely denticulate, with larger denticles at regular rather distant intervals.

The legs are slender and not, or hardly, longer than the arm; their dactylus is narrowly lanceolate and fringed with longish stiffish hairs, as is also the dorsal edge of the propodite.

On the long penultimate piece of the male abdomen is a terminal granule.

Colours in spirit: pinkish flesh-colour, the chelipeds and legs coppery, the front and branchial regions often with a bluish tinge.

The largest adult male in the Indian Museum collection has the carapace 28 millim. long (without spine) and 23 millim. broad.

Found on both coasts of the Peninsula, at the Andamans, and in the Persian Gulf.

In the Indian Museum there are 57 specimens, including numerous adults of both sexes.

[*Myra pentacantha*, n. sp. ?

Most probably the young of M. fugax.

Differs from *Myra fugax* Fabr. in the following characters:—

(1) the carapace is almost circular, and is somewhat depressed, except in the middle line where it is strongly carinated:

(2) the front is thickly pubescent, and the whole of the free edge of the buccal cavern is visible beyond it in a dorsal view:

(3) the intestinal region is well defined and rather tumid, and is

surmounted in the middle line by a raised cluster of granules, terminating, but discontinuous with, the carina of the carapace:

(4) in addition to the 3 spines on the posterior margin of the carapace there is a spine or spinule on either postero-lateral margin above the last pair of legs:

(5) on the antero-lateral margin, immediately behind the branchio-hepatic notch, are several denticles.

The chelipeds are not quite twice the length of the carapace: they are slender, and their constituent pieces have the same proportions as in the adult female of *M. fugax*.

The carapace of an average specimen is 8.5 millim. long and 8 millim. broad.

In the Indian Museum are 29 specimens from both coasts of the peninsula. Commonest at about 25 fathoms.

I regard these as the very young of *M. fugax* first because among 57 specimens of that species in the Indian Museum there is not a single very young one, and secondly because a fine large adult male of that species in our collection has the additional spine well developed on one side. Again it is suggestive that although *M. pentacantha* appears to be a common enough form, it is never found as an adult.]

42. *Myra affinis*, Bell.

Myra affinis, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 296, pl. xxxii. fig. 2, and Cat. Leucos. Brit. Mus., p. 12: Stimpson, Proc. Ac. Nat. Sci. Philad. 1853, p. 160: Haswell, P. L. S. N. S. Wales, IV. 1879, p. 50, and Cat. Austral. Crust., p. 121: Miers, Zool. H. M. S. 'Alert' pp. 184, 150, and 'Challenger' Brachyura, p. 315: A. O. Walker, Journ. Linn. Soc., Zool., XX. 1890, p. 111.

Myra mamillaris, Miers (*nec* Bell), Miers, Trans. Linn. Soc. (2) I. 1875-79 (1877) p. 239, pl. xxxviii. figs. 25-27, and 'Challenger' Brachyura, p. 315.

Myra subgranulata, Kossmann, Reise roth. Meer. Crust., p. 65, pl. i. fig. 7, and Archiv. für Naturg. XLIV. 1878, p. 256.

? *Myra australis*, Haswell, Proc. Linn. Soc. N. S. Wales, IV. 1879, pp. 50 and 404, pl. v. fig. 3, and Cat. Austral. Crust., p. 122: Miers, Zool. H. M. S. 'Alert' pp. 184, 251, and 'Challenger' Brachyura, p. 315: A. O. Walker, Journ. Linn. Soc. Zool., XX. 1890, p. 111: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 402.

Myra punctata, de Man, Journ. Linn. Soc., Zool., XXII. 1878, p. 205 (*nec synon*).

Differs from *Myra fugax*, adult males being compared, in the following characters:—

(1) the carapace, including the surface of the sub-hepatic facet, is covered with crisp granules, all very plainly visible to the naked eye; its longitudinal median carina is persistent and granular; its posterior marginal spines are shorter and blunter, the middle one being sharp and recurved, the lateral ones dentiform:

(2) the chelipeds are stouter and shorter, being a little less than twice the length of the carapace (without spine); the hand especially is stouter and shorter, being hardly half the length of the carapace; the fingers are about $\frac{2}{3}$ the length of the hand:

(3) the long penultimate piece of the male abdomen carries a strong terminal tooth.

Colours in spirit: some reddish or orange markings on the carapace, and some broad orange-reddish cross-bands on the chelipeds.

The largest adult male in the Indian Museum collection has the carapace 17 millim. long and 15 millim. broad.

In the young the intestinal region is distinctly delimited, rather tumid, and is surmounted by a raised cluster of granules terminating, but discontinuous with, the median carina of the carapace.

In the Indian Museum collection are 16 specimens from Arakan, Mergui, Andamans, Ganjam coast, and the Persian Gulf.

The specimens here included comprise (1) adult forms that answer to Bell's descriptions and figures of *M. affinis* and are readily distinguishable from *M. fugax* (a) by the relative stoutness and shortness of the chelipeds and hands and (b) by the shortness and coarseness of the spines, and (2) half-grown forms that correspond with Haswell's figure of *M. australis*, and Miers' figures of *M. mamillaris* (*loc. cit.*) which Miers in his work on the 'Challenger' Brachyura refers to *M. australis*. Although Haswell's figure and description hardly correspond—e.g., the fingers are described as being about half the length of the hand, but are figured as nearly equal to the hand in length—I cannot but think that his species represents the immature form of *M. affinis*.

In very young specimens there is a denticle or enlarged granule on either postero-lateral margin above the last pair of legs.

43. *Myra brevimana*, n. sp.

Differs from *M. fugax*, a large series of fully adult males and ovigerous females being compared, in the following characters:—

(1) the carapace is much more convex, being ovoid in the male, subglobular in the female; its surface, including the surface of the subhepatic facet, is crisply granular and its longitudinal median carina is persistent and granular, as in *M. affinis*; the posterior marginal spines are as in *M. affinis*, the middle one being short stout acute and recurved, the lateral ones being dentiform:

(2) the front is much more deeply and acutely bidentate, and otherwise is shaped much as in *Leucosia*, being strongly convex, being delimited from the hepatic regions on either side by a hollow, being well recurved upwards, and projecting so far that no part whatever of

the buccal frame or of the external maxillipeds can be seen in a dorsal view even in the deep incision between the frontal teeth :

(3) the tooth on the posterior part of the upper of the two lines that defines the hepatic facet is almost as large and prominent as that on the lower :

(4) the chelipeds are quite similar in both sexes, and are stout, especially the hand ; they are just under twice the length of the carapace (without spine). The hand is hardly two-fifths the length of the carapace (without spine), is more than half as broad as long, and is somewhat inflated ; the fingers are as long as the hand, the dactylus being plainly longer than the outer border of the hand :

(5) on the long penultimate piece of the male abdomen is a strong terminal tooth.

Colours in spirit : regions of carapace defined by broad orange-red markings, some broad orange-red cross-bands on chelipeds, one of which occupies the basal half or three-fourths of the fingers.

Carapace in the adult male 16 millim. long and 14 millim. broad, in the adult female 20 millim. long and 18 millim. broad.

In the Indian Museum are 34 specimens from Arakan, Mergui, Ganjam, and Ceylon, usually at depths of about 30 fathoms.

In the young the intestinal region is well defined and tumid, and is surmounted by a raised cluster of granules in a line with the median longitudinal carina.

The prominent front, the stout chelipeds, and the short inflated hands are characters by which this species is easily recognized.

44. *Myra darnleyensis*, Haswell.

Myra darnleyensis, Haswell, Proc. Linn. Soc., N. S. Wales, IV. 1879, p. 52, pl. v. fig. 4, and Cat. Austral. Crust. p. 122 : Miers, 'Challenger' Brachyura, p. 316.

Carapace sub-piriform, globous dorsally, the lateral margins full and inflated and not defined by any beaded line ; the surface very finely and closely granular (under the lens) ; the intestinal region fairly well defined, as are also the branchial regions posteriorly.

The three processes on the posterior margin are not spines, but broadly-laminar petaloid lobes.

The front is prominent, but the dentiform ends of the walls of the branchial canals can be seen beyond it in a dorsal view : it is deeply channelled in the middle line, dorsally, and has a fluted appearance : the outer wall of the orbit has the same elegantly fluted appearance, owing to the depth of the sutures and the convexity of the surfaces between the sutures.

Behind the front the side-wall of the hepatic regions is full and

convex, not flattened and distinctly faceted as it is in other species : it bears, however, a strong mammillary tubercle. As in the other species, there is a well-defined notch in the antero-lateral margin between the hepatic and branchial regions—the notch as usual being in continuity with a crease in the pterygostomian face, and this with a groove in the lateral wall of the carapace.

The external maxillipeds are granular and hairy distally, being alike in both sexes.

The chelipeds are alike in both sexes and are about twice the length of the carapace : all the surfaces of the arm in the greater part of its extent are vesicular-granular, but the granules are only just visible to the naked eye. The hand is short, about one-third the length of the carapace (without spine), and is somewhat inflated. The fingers are markedly longer than the hand, the dactylus being about half again as long as the outer border of the hand.

The long penultimate piece of the abdomen of the male carries a stout terminal denticle.

Colours in spirit much as in *M. brevimana*, the regions of the carapace being defined by broadish orange-red markings, and the chelipeds having some broad cross-bands of the same colour, but these never involve the fingers, which are white.

In the male the carapace is 13 millim. long (without spine) and 11 millim. broad, in the female 15 millim. long and 13 millim. broad.

In the Indian Museum are 52 specimens, including adult males and ovigerous females, from the Andamans, Maldives, Palk Straits, and from off Ceylon 34 fms.

In many adult females, as in most young, there is in the middle of the carapace a cruciform constellation of 5 enlarged bead-like granules or denticles. In the young also the side wall of the hepatic region is not so much inflated and even shows traces of flattening, while the tumid intestinal region is surmounted by an enlarged granule, and on either postero-lateral margin (in the very young), just above the last pair of legs, is a denticle or enlarged granule.

45. *Myra elegans*, Bell.

Myra elegans, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 297, pl. xxxii. fig. 4, and Cat. Leucos. Brit. Mus. p. 13.

Carapace elongate-oval tapering to a long acute spine at the posterior margin, half again as long as broad without the spine, nearly twice as long as broad with the spine. On either side of the spine is a spinule situated at either extreme of the short posterior margin, and a little in advance of these, on either postero-lateral margin, just above the last pair of legs, is sometimes a sharp denticle.

The carapace is traversed longitudinally, from the middle of the gastric region, by a broadish granular carina, and there is an elongate patch of granules along the middle of either branchial region and a patch round and on the big posterior spine; otherwise the carapace is smooth.

The front is broadly bilobulate, each semi-circular lobule having a knife-edge, and although it projects beyond the margin of all parts of the buccal cavern, yet the hairy tips of the external maxillipeds can be seen beyond it in a dorsal view.

Behind the front the side wall of either sub-hepatic region forms a not very well marked hairy facet, behind which there is no well marked marginal notch as there is in the other species. The lateral margins of the carapace are well defined and beaded throughout.

The chelipeds are nearly similar in both sexes, being slender and short—only about $1\frac{1}{2}$ times the length of the carapace (without spine): the upper surfaces of the cylindrical arm are covered with enlarged vesicular granules in the greater part of their extent, and the under surface at base only: the hand is short, hardly a quarter the length of the carapace (without spine): the fingers are almost one-fourth longer than the hand.

The legs are compressed, especially the carpopodites and propodites, the latter and the dactyli having hairy edges.

The long penultimate piece of the abdomen of the male has a terminal denticle.

The largest male in the Indian Museum has the carapace 12 millim. long and 8 millim. broad: in an apparently adult female the carapace is 15.5 millim. long and 10.5 millim. broad.

A young and two apparently adult males and an adult female from a muddy bottom, in 12 fms., off the Madras coast, and a young male from off the Arakan coast 13 fms., are in the Indian Museum. In the last mentioned the wrist and hand are elegantly fluted with lines of raised granules.

Although our female is not laden with eggs, I conclude that it is adult because it has the wide deep brood-chamber with the broad convex abdominal lid so familiarly found in the adult females of the *Leucosidæ*. Moreover the carapace is stained and worn as if it had not been renewed for a long time. *Myra elegans* is certainly not the young of any other Indian species.

LEUCOSIA, Fabr.

Leucosia, Fabricius, Ent. Syst. Suppl., p. 349.

Leucosia, Milne Edwards, Hist. Nat. Crust. II. 121.

Leucosia, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 281, and Cat. Leucos. Brit. Mus., p. 5.

Leucosia, A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 39.

Leucosia, Miers, 'Challenger' Brachyura, p. 322.

The whole exo-skeleton is of the consistence and appearance of glazed porcelain.

Carapace extremely convex, sub-circular or subrhomboidal to hexagonal in outline, perfectly smooth, with none of the regions—except sometimes the hepatic—defined: in front of the hepatic regions it is produced to form a sort of upturned snout, underneath the tip of which are found the minute eyes sunk in deep round complete orbits, the obliquely-folding antennules, and the minute antennæ lying below the antennules.

The lateral epibranchial angles of the carapace form on either side a distinct lobe, which is bent downwards towards the base of the chelipeds to form the eave of a deep sinuous depression in the side-wall of the carapace, known as the thoracic sinus.

The true postero-lateral margin of the carapace is ill-defined posteriorly, and the epimeral edge of the carapace—which practically takes the place of most of the postero-lateral margin—is greatly thickened and elegantly milled. These epimeral edges on either side are continuous with a finely-beaded crest that forms the posterior margin of the dorsum of the carapace; and below this posterior margin the carapace ends in a deflexed posterior wall.

The buccal cavern is elongate-triangular, and the front part of its side walls are coincident with the sides of the snout-like front of the carapace: the acutely-triangular merus of the external maxillipeds is about as long as the ischium, and the outer margin of the exognath is almost straight.

The chelipeds are symmetrical and, relatively to the legs, very massive; they are a little longer in the male than in the female, but are very rarely more than half again as long as the carapace: the margins and certain parts of the surfaces of the arms are ornamented with large polished pearly tubercles: the hands are usually short and broad and little longer than the fingers. The true legs are small.

The abdomen of the male consists usually of 4 pieces, but the two large middle pieces (which are formed of 5 terga) are sometimes fused, into one: the abdomen of the female also consists of 4 pieces usually, but the large oval third piece (which is formed of 4 terga) is sometimes fused with the second piece.

The so-called thoracic sinus of *Leucosia* is simply an invagination of the after part of the pterygostomian region and of the side-wall of the carapace, as may be seen by comparing cleaned carapaces with those of other Leucosines.

The invagination seems to be chiefly due to the pushing up of the epimeral margin against the resistance of the vault of the carapace—a pushing up which may be inferred from the position of what remains of the “epimeral suture.”

The origin of the thoracic sinus from such a simple invagination is very apparent in the isolated carapace of *Leucosia unidentata*. Here, viewed from the inside of the carapace, the thoracic sinus is seen as the convexity of a pocket; and, viewed from the outside, the mouth of the sinus shows as a ring of large granules or puckers resulting from invagination.

Key to the Indian species of Leucosia.

A. NORMAL GENERA: free edge of front projecting beyond the epistome: hands not foliaceous:—

I. Carapace conspicuously longer than broad, bluntly rhomboidal, quite devoid of definite pubescence, the thickened epimeral edge never visible in all its extent, dorsally, when the carapace is held, without any inclination, straight in front of the observer's eyes: front never ending in three sharp horizontal prongs: the thoracic sinus always defined in some part of its extent by large granules visible to the naked eye: no extensive growth of hair, or definite patches of spongy pubescence at the base of the upper surface of the arm: meropodites of legs subcylindrical: abdomen in both sexes consisting of 4 pieces:—

1. Outer edge of hand never carinate: front dorsally convex in all its extent: posterior margin of carapace, in the adult, usually gently convex, with its external angles not defined:—

i. True postero-lateral margin of carapace beaded as far as the level of the base of the last pair of legs: ventral surface of ischium of external maxillipeds of female almost flat—never broadly carinate:—

a. A loop of large granules between the base of the chelipeds and the margin of the carapace: two small red and white ocelli on either side of the gastric region

L. unidentata.

b. A single row of large granules between the base of the chelipeds and the margin of the carapace, and above it a second row of very small granules running into the puckered edge of an almost circular bight in the pterygostomian region: no ocelli

L. obtusifrons.

ii. True postero-lateral margin of carapace beaded only up to the level of the base of the first pair of true legs: a single row of large granules between the base of the chelipeds and the margin of the carapace:—

a. Carapace, excluding the whole front, broader than long, its posterior margin gently convex:—

aa. Thoracic sinus deep, the convex edge of the pterygostomian region, which defines the sinus

anteriorly, being finely granular: front ending in a triangular projecting beak: ventral surface of ischium of external maxillipeds of female broadly carinate up to a stout terminal tooth:—

a. Hepatic regions each forming a strong mammary bulge, dorsally, quite independent of the general convexity of the carapace: meropodites of true ambulatory legs perfectly smooth

L. longifrons.

β. Convexities of hepatic regions hardly distinguishable, dorsally, from the general convexity of the carapace: meropodites of true ambulatory legs with some longitudinal granulation:—

a1. Meropodites of legs with 3 rows of granules: inner edge of hand with several rows of granules: size under 25 millim.....

L. neocaledonica.

a2. Meropodites of legs with a single row of granules: inner edge of hand with a single row of granules: size over 35 millim.

L. urania.

bb. Thoracic sinus shallow, the convex edge of the pterygostomian region, which defines the sinus anteriorly, smooth and entire: edge of front sharply transverse, and sinuous: ventral surface of ischium of external maxillipeds of female non-carinate

L. haswelli.

b. Carapace, excluding the front, as long as broad, its posterior margin almost straight.....

L. marmorea.

2. Outer edge of hand raised into a sharp carina: posterior margin of carapace, in the adult, straight, with its external angles pronounced:—

i. Front dorsally concave in the middle line anteriorly:—

a. Size medium (carapace over 20 millim. long): thoracic sinus defined ventrally by a row of granules of which 3 or 4 are pearl-like

L. pallida.

b. Size small (carapace under 15 millim. long): thoracic sinus with at most three granules, two of which are very large and reniform or fungiform ...

L. whitmeei.

ii. Front convex dorsally in all its extent, produced beyond the orbits into a broadly triangular point as in

L. longifrons

L. corallicola.

II. Carapace conspicuously longer than broad, sharply hexagonal, devoid of definite pubescence outside of the thoracic sinus, the thickened epimeral edge visible, dorsally, in all its extent when the carapace is held without any inclination straight in front of the observer's eyes: front ending in three sharp horizontal prongs: the thoracic sinus is filled with hair, and is not defined in any part of

its extent by granules visible to the naked eye: a definite patch of encrusting spongy pubescence at the basal end of the upper surface of the arm: meropodites of legs compressed: abdomen of the male consisting of 3 pieces, of the female of 4 pieces:—

1. Front much broader than long, distinctly trigonal, its sides merging in the antero-lateral borders of the carapace without any very abrupt transition: thoracic sinus deep, the edge of the pterygostomial region, which forms the anterior boundary of the sinus, convex and granular or milled: surface below the posterior margin of the dorsum of the carapace sharply granular:—

i. Outer limb of the thoracic sinus not invading the antero-lateral margin of the carapace.....
ii. Outer limb of the thoracic sinus invading, and causing a marked emargination of, the antero-lateral border of the carapace

L. craniolaris.

L. vittata.

2. Front about as long as broad, with the sides sub-parallel or, at any rate, forming an abrupt junction with the antero-lateral borders of the carapace: thoracic sinus shallow, the edge of the pterygostomial region, which forms the anterior boundary of the sinus, not strongly convex and not granular or milled:—

i. The edge of the pterygostomial region that bounds the thoracic sinus almost straight: surface of carapace below the posterior margin of dorsum granular: inner surface of hand with two prominent sharp-cut rows of granules: size about 14 millim.
ii. Edge of the pterygostomial region a little convex: surface of carapace below posterior margin smooth: inner surface of hand smooth, or with a single row of obsolescent granules: size about 18 millim.....

L. rhomboidalis.

L. pubescens.

III. Carapace as broad as long, urn-shaped or broadly hexagonal, often with a strip of thick fur along the postero-lateral border, the thickened epimeral edge visible, dorsally, in all its extent when the carapace is held without any inclination straight in front of the observer's eyes: front obtuse: the thoracic sinus with or without granules: either a definite patch of spongy pubescence or a good deal of coarse hair at the basal end of the upper surface of the arm: meropodites of legs compressed: [abdomen of male consisting of 4 pieces, that of the female of 3, or if of 4, then the 3rd piece is again incompletely subdivided]: size very small, rarely 14 millim.:—

1. Lateral epibranchial angle and true postero-lateral border of the carapace with a sharply defined edging of thick fur:—

i. Outer edge of hand, if sharp, never distinctly carinate: front with the dorsal surface uniformly convex:—

a. Thoracic sinus defined ventrally by relatively large granules: hepatic region culminating, dorsally, in a granular eminence: arms covered with tubercles: hands subglobular: abdomen of female of 4 pieces, the large third piece incompletely subdivided into three

L. whitei.

b. Thoracic sinus not defined by granules: hepatic regions smooth and ill-defined: surfaces of arms not everywhere invested with tubercles, a definite patch of spongy pubescence at the basal end of the upper surface: hands of the ordinary form: abdomen of female formed of 3 pieces:—

aa. Four rows of tubercles—including those on the inner and outer margins—along the upper surface of the arm: fur and pubescence on carapace and chelipeds black (in spirit): carapace (in spirit) reticulated with bright brown

L. margaritata.

bb. Upper surface of arm with only a few tubercles besides those on the margins: fur and pubescence yellowish white: carapace covered with crimson spots

L. hæmatosticta.

ii. Outer edge of hand strongly carinate: front with the dorsal surface concave in the middle line giving a bilobed appearance

L. elata.

2. Lateral epibranchial angle and true postero-lateral border of the carapace devoid of fur:—

i. Front prominent beyond the hepatic regions: posterior border of the carapace not equal in length to half the greatest breadth of the carapace: thoracic sinus deep and sharply defined in front: hand hardly longer than the fingers.....

L. cumingii.

ii. Front hardly prominent beyond the unusually strong convexity of the hepatic borders: length of the posterior border of the carapace more than half the greatest breadth of the carapace: hand about twice as long as the fingers

L. sima.

B. PECULIAR GENERA:—

I. Free edge of front not projecting beyond the level of the epistome. Otherwise belonging to the *craniolaris* group

L. truncata.

II. Hands foliaceous: chelipeds shorter than the carapace: thoracic sinus ill defined. Otherwise belonging to the *longifrons* and *marmorea* group.....

L. phyllochira.

46. *Leucosia unidentata*, De Haan.

Leucosia unidentata, DeHaan, Faun. Japon., Crust., p. 133, pl. xxxiii, fig. 3: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 284, and Cat. Leucos. Brit. Mus. p. 6: Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 44, and Cat. Austral. Crust. p. 118.

Leucosia obtusifrons var. *unidentata*, Ortmann, Zool. Jahrbucher, Syst. etc., VI. 1892, p. 585.

Carapace bluntly hexagonal or subcircular, about nine-tenths as long as broad: its surface perfectly smooth and devoid of hair: its antero-lateral borders sinuous, convex, faintly beaded anteriorly, strongly beaded posteriorly: its *true* postero-lateral border distinctly beaded or crenulate up to the level of the base of the *last* pair of legs: its thickened milled epimeral edge, which is continuous with the posterior margin and ends at a sharp tooth just behind the base of the chelipeds, is not visible, dorsally, when the carapace is held, without any inclination, straight in front of the observer's eyes: its posterior margin short, gently curved, finely beaded, with the deflexed surface below it quite smooth.

The puckered mouth of the pterygostomian invagination—the thoracic sinus of Bell and subsequent authors—shows as a roughly 9-shaped loop of equal-sized large pearly granules situated between the base of the chelipeds and the strongly-pronounced lateral angle, or eave, of the carapace: the pterygostomian plate is deeply indented, transversely, in front of this loop of granules.

The convexities of the hepatic regions are an almost indistinguishable part of the general convexity of the carapace.

The front is prominent, dorsally convex, and truncate-triangular; its length is less than its breadth; its front edge is strongly deflexed and very faintly trilobed, the middle lobe being mucronate.

The ventral surface of the ischium of the external maxillipeds in the female, as in the male, is flat and smooth.

The chelipeds in the adult male are considerably more than half again as long as the carapace. The upper surface of the arm has two divergent longitudinal rows of pearly tubercles in addition to those that bound its inner and outer borders: these two rows start from a basal eminence formed of 7 or 8 smaller coalescent tubercles, and end near the distal quarter of the arm. The inner surface of the arm is completely covered with pearly tubercles of unequal size: the under surface is smooth except in its basal third, or half. The wrist is smooth except for two lines of bead-like granules bounding its inner surface,—one line dorsal in position, the other ventral. The hand and fingers together are as long as the arm. The hand is half again as long as broad, its narrow inner surface bears several rows of small bead-like granules the upper and lower of which are sharply defined and converge

elegantly to the immobile finger, along which they are usually continued for some distance. The fingers are as long as the hand, and have their opposed edges crenulate throughout their extent.

The legs have stout subcylindrical meropodites (the trigonal origin of which, however, is shown by three longitudinal rows of fine granulation), inflated carpopodites, stout dorsally-sharp-edged propodites, and broadly lanceolate, or palmulate, dactyli.

The abdomen in both sexes consists of 4 distinct pieces, the third piece in the male bearing a strong tooth in the middle line.

Colours in spirit: carapace slate-grey with four small ocelli—two on either side of the gastric region: the ocelli have broad red circumferences and small white centres: the pearly tubercles of the upper surface of the arm have the base orange-red and the apex white: the fingers have a yellowish red base, and the legs are indefinitely banded with yellowish red.

The carapace of an adult of average size, of either sex, is about 30 millim. long and 27 millim. broad.

In India this species has been found only off the Malabar Coast at 45 fathoms. In the Museum collection are an adult male and female, and three half-grown females from the Malabar Coast, (and four adult females from Hongkong.)

47. *Leucosia obtusifrons*, De Haan.

Leucosia obtusifrons, De Haan, Faun. Japon. Crust. p. 133, pl. xxxiii. fig. 2: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 284, and Cat. Leucos. Brit. Mus. p. 6: A. Ortmann, Zool. Jahrbucher, Syst. etc. VI. 1892, p. 585.

Differs from *L. unidentata*, De Haan, only in the following characters, adults of both sexes being compared:—

1. The puckered mouth of the pterygostomian invagination—or thoracic sinus—is still visible in all its extent as a long loop of granules lying between the base of the chelipeds and the eave of the carapace; but the granules of the dorsal limb of the loop are so small as to be only visible with a lens; those of the front convexity of the loop have—by a further infolding of the pterygostomian region—become partly welded together and cut off to form an almost isolated ring; while only those that form the ventral limb of the loop remain as large separate granules.

2. The two rows of tubercles on the upper surface of the arm are shorter, ending within the proximal half of the arm.

3. The chelipeds, in the adult male, are less than half again as long as the carapace.

4. The dactyli of the legs are narrowly lanceolate, not palmulate.

5. On either side of the gastric region are two white spots, instead of two red and white ocelli.

6. The body is somewhat smaller, the carapace in the average adult male measuring 25 by 23 millim., and in the average adult female 26 by 24 millim.

In the Museum Collection are 2 adult males, 4 egg-laden females, 2 young males, and a young female, from the Coromandel Coast.

The structural and colour differences hold good irrespective of age or sex, and I therefore think that De Haan's separation of this species from the preceding is justified.

48. *Leucosia longifrons*, De Haan.

? *Cancellus anatum secundus*, Rumph, Amboin. Rariteitkamer, I. 27, pl. x. fig. B.

? *Araneus marinus*, Seba, Thesaurus, III. 46, pl. xix. figs. 4, 5.

Leucosia longifrons, De Haan, Faun. Japon. Crust. p. 132, pl. xxxiii, fig. 4: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 284, and Cat. Leucos. Brit. Mus. p. 6: A. Ortmann, Zool. Jahrbüch., Syst. etc., VI. 1892, p. 585.

? *Leucosia urania*, Guérin, Icon. R. A. Crust., pl. vi. fig. 4 (*nec* Herbst).

Leucosia polita, Hess, Archiv für Naturges. XXXI. i. 1865, pp. 155 and 172, pl. vi. fig. 14; (and ? Haswell, Cat. Austral Crust. p. 120); *fide* de Man, Zool. Jahrbüch. Syst. etc., II. 1892, p. 585.

Leucosia ornata, Miers, Trans. Linn. Soc., Zool., (2) I. 1875-79, p. 236, pl. xxxviii. figs. 7-9.

Leucosia urania, de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 197 (*nec* Herbst).

Carapace bluntly rhomboidal, about nine-tenths as long as broad: its surface perfectly smooth and devoid of hair: its antero-lateral borders finely beaded, and strongly sinuous, owing to the prominence of the edge of the well-defined hepatic region: its *true* postero-lateral border beaded only as far as the level of the first pair of legs (2nd pereopods): its thickened milled epimeral border is visible, dorsally, only in its posterior third when the carapace is held, without any inclination, straight in front of the observer's eyes: its posterior margin short, gently curved, and finely beaded, with the deflexed surface below it quite smooth.

The thoracic sinus is no longer recognizable as the puckered mouth of a simple pterygostomian invagination: it is now a roughly Y-shaped cavity, the tail of the Y being defined by a line of 6 or 7 large pearly granules continuous with the milled epimeral edge of the carapace, the concavity of the fork of the Y being defined by the convex crenulated edge of the pterygostomian region, and the outer limb of the Y being a good deal longer than the inner.

The hepatic regions are strongly convex dorsally, their convexities being quite independent of the general convexity of the carapace.

The front is prominent, triangular, and dorsally convex; its length is at least equal to its breadth, and it ends in a projecting laminar triangular tip.

The ventral surface of the ischium of the external maxillipeds of the female is strongly convex up to a stout terminal tooth.

The chelipeds, in the adult male, are less than one-third longer than the carapace. The upper surface of the arm has both its anterior and posterior borders defined by a distally-incomplete row of tubercles, and, besides the basal eminence formed of 6 to 8 coalescent granules, has four—rarely five or more—large tubercles disposed in an irregular square just beyond the basal eminence: the inner surface of the arm has a few tubercles in its proximal half, as has also the under surface in its proximal fourth. The wrist is quite smooth. The hand is very little longer than broad, its inner edge bears a single row of granules which are often indistinct. The fingers are not much shorter than the hand, and their opposed edges are crenulate—and that but indistinctly—only in their distal two-thirds.

The legs have stout, subcylindrical, perfectly smooth meropodites, inflated carpopodites, propodites with a sharpish dorsal edge, and, in the case of the last pair, with the ventral edge sharp also, and narrowly lanceolate dactyli which are more than half again as long as their propodites.

The abdomen in both sexes consists of 4 distinct pieces, the third piece, in the male, having a denticle in the middle line.

Colours in spirit: carapace light yellowish-brown, with a horseshoe of six impressed white spots in the gastric region, and with a narrowly defined red ring in either branchial region posteriorly; legs broadly banded with yellowish red; fingers with reddish base and white tip; tubercles on upper surface of arm with red base, sharply defined, and white apex.

The carapace of an average adult male is 22 millim. long and 18 millim. broad, of an adult female 25 millim. long and 22 millim. broad.

Over 80 specimens of all ages, from the Andamans, Mergui, Ceylon, and the Persian Gulf.

48a. *Leucosia longifrons*, var. *neocaledonica*, A. Milne Edwards.

Leucosia neocaledonica, A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 40, pl. ii. fig. 1; and? Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 46; and? de Man, Notes Leyden Mus. III. 1881, p. 123.

? *Leucosia urania*, de Man, Notes Leyden Mus. III. 1881, p. 256.

This is certainly a well-marked variety, and perhaps a distinct

species. It differs from *L. longifrons*, De Haan, only in the following characters, adults of both sexes being compared :—

1. The carapace is closely punctate.
2. The antero-lateral border is *sharply* crenulate.
3. The hepatic regions although equally convex in the antero-lateral margins, have their dorsal convexity hardly distinguishable from the general convexity of the carapace.
4. The terminal tooth on the ventral surface of the ischium of the external maxillipeds of the female is extremely acute and prominent.
5. Along the inner edge of the hand, below the upper row of granules, which are very distinct, are several indefinite rows of granules.
6. Along the inner edge of the upper surface of the wrist is a line of 3 or 4 granules.
7. The meropodites of the ambulatory legs have three distinct longitudinal lines of granules,—one dorsal, two ventral.
8. The propodites of the ambulatory legs have their dorsal edges not merely sharp, but highly carinate, and have also their ventral edges carinate.

9. The colours, when good fresh spirit specimens are compared, are very different. On the gastric region is a pair of large ocelli with small white centres and very broad red outer rings. In faded specimens the colours are much those of *L. longifrons*, but even then, instead of two round spots or rings in the posterior half of the carapace, there are from 4 to 6 large spots round the posterior half of the circumference of the carapace.

Its average size is a little less than that of *L. longifrons*.

In the Museum collection are 35 adult males and females from Palk Straits, from Karáchi, and from the Persian Gulf.

48b. *Leucosia longifrons*, var. *pulcherrima*, Miers.

? *Cancellus anatum primus*, Rumph, Amboin. Rariteitkamer, I. 27, pl. x. fig. A.

Leucosia pulcherrima, Miers, Trans. Linn. Soc., Zool., (2) I. 1875-79, (1877) p. 236, pl. xxxviii. figs. 4-6: Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 46, and Cat. Austral. Crust. p. 119.

Leucosia splendida, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 47, pl. v. fig. 1, and Cat. Austral. Crust. p. 119.

This is certainly only a variety of *L. longifrons*, De Haan, from which it differs chiefly in the colouration, which is altogether richer and more brilliant. Adult females compared, the only apparent differences from *L. longifrons* are as follows :—

1. The surface of the carapace is slightly punctate.
2. The propodites of the ambulatory legs are highly carinate dorsally, and have also their ventral edges carinate, as in var. *neocaledonica*.

3. The two red rings on the posterior half of the carapace are often, but not always, much larger, and the six white spots on the anterior part of the carapace are enclosed in six red circles, which often partly coalesce to form a double trefoil pattern.

In the Museum collection are an adult female, two half-grown females, and a half-grown male, all from the Persian Gulf; and the characteristic trefoil pattern occurs only in the adult female.

49. *Leucosia urania*, Herbst.

Leucosia urania, Herbst, Krabben, III. ii. 17, pl. liii. fig. 3: Leach, Zool. Miscell. III. p. 21: Desmarest, Consid. Gen. Crust., p. 167: Milne Edwards, Cuv. Règne An., Crust. pl. xxv. fig. 1, and ? Hist. Nat. Crust. II. 122: Bell, Trans. Linn. Soc. XXI. 1855, p. 283, and Cat. Leucos. Brit. Mus. p. 6: Hilgendorf, MB. Ak. Berl. 1878, p. 811.

This species, although closely resembling *L. longifrons*, and especially the variety (or species) *neocaledonica*, is at once distinguished from these, and from all other species, by its comparatively great size. It is a giant in the genus *Leucosia*, the carapace of an adult female in the Indian Museum collection being 38 millim. long and 34 millim. broad, dimensions almost equalled by Herbst's figure.

It differs from *L. longifrons* only in the following particulars, adult females being compared:—

1. It is very much larger.
2. The antero-lateral border is but slightly sinuous, owing to the slight prominence of the hepatic regions, of which also the dorsal convexities are an almost indistinguishable part of the general convexity of the carapace.
3. The hand is as broad as long, and the fingers have their opposed edges crenulate throughout.
4. The meropodites of the legs are traversed ventrally by a line of granules.
5. The propodites of the legs are foliaceous.
6. The dactyli are broadly lanceolate, and are only equal in length to their propodites.
7. Colours (of a thoroughly well-preserved specimen that has been eight years in spirit) olive green, with a broad white median band, forked posteriorly, extending from the tip of the front to the after end of the gastric region; four dusky red blotches round the posterior half of the circumference of the carapace: legs yellow, banded with red; basal half of fingers red.

Loc. Andamans.

The single female specimen in the Indian Museum collection is the exact counterpart of Herbst's figure.

50. *Leucosia marmorea*, Bell.

Leucosia marmorea, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 286, pl. xxx. fig. 4: E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 49 (*gastric teeth*): A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 111.

Carapace highly polished, piriform, *longer than broad by the whole extent of the front*: its antero-lateral borders finely beaded, *slightly sinuous*, and *gradually convergent*: its true postero-lateral border beaded only as far as the level of the first pair of legs (2nd pereopods): its epimeral edge not visible in a dorsal view: its finely-beaded posterior margin *almost straight*, with the surface below it quite smooth.

The thoracic sinus is a roughly Y-shaped cavity, the tail of the Y being defined by a line of 5 or 6 small pearly granules continuous with the milled epimeral edge, the concavity of the Y being defined by the convex, *very finely crenulated* edge of the pterygostomian region, and both limbs of the Y being very short.

The hepatic regions are hardly defined posteriorly by a faint crease.

The front is prominent, dorsally convex, and truncate-triangular, ending in three minute teeth, of which the middle one is the largest.

The ventral surface of the ischium of the external maxillipeds of the female is smooth, *and not strongly convex*.

Chelipeds little longer than the carapace. The arm has its three borders tuberculate; its upper surface with 5 to 7 pearly tubercles, in two short rows, in its basal half, just beyond a basal eminence formed of 6 to 8 coalescent granules; its inner surface granular or tubercular in rather more than its basal half, and its under surface in rather more than its basal third. The wrist and hand both have a row of sharp-cut granules along their inner edge. The fingers, which meet only at their tips, have the opposed edges distantly crenulate.

The legs are slender: their meropodites are subcylindrical with longitudinal rows of microscopic granulation, dorsally and ventrally: their propodites have sharpish edges, but are not dilated: their dactyli, which are somewhat longer than the propodites, are very narrowly lanceolate.

Colours in spirit: rich warm yellowish-brown with two pale round spots on either side of the gastric region.

Length of carapace of an adult female 23 millim., breadth 18.5 millim.

A young and four adult females from the Andamans.

Among Indian species of the *L. longifrons* group, this is at once recognized by its elongate piriform carapace, by its truncate front, by its nearly straight posterior margin, by its slender legs, and by its warm cinnamon brown colour.

51. *Leucosia haswelli*, Miers.

Leucosia haswelli, Miers, 'Challenger' Brachyura, p. 324, pl. xxvii. fig. 2.

Carapace with the antero-lateral margins slightly sinuous, owing to the slight convexity of the hepatic regions, which also are defined posteriorly, on the dorsum of the carapace; only by a faint crease. In other respects the carapace almost exactly resembles that of *L. longifrons*, but is a little more convex.

The front ends abruptly in a projecting, sharply transverse, sinuous edge, the edge under a lens being seen to be faintly bilobed with each lobule again faintly emarginate.

The thoracic sinus is a roughly Y-shaped cavity of no great depth, the tail of the Y being defined by four large pearl-like granules situated above the base of the chelipeds, the concavity of the fork of the Y being defined by the convex perfectly smooth edge of the pterygostomian region, and the limbs of the Y being both equally short.

The ventral surface of the ischium of the external maxillipeds of the female is moderately convex without a terminal tooth.

The chelipeds are almost exactly like those of *L. longifrons*; but on the upper surface of the arm there are always at least six pearly tubercles, in two short lines, running forwards from the basal eminence formed of coalescent granules, and these tubercles, like some of those on the inner edge of the arm, are of an uniform transparent blood-red colour; the wrist has a row of tiny blood-red granules along its inner edge; and the hand has not only a row of granules along its inner edge, but also, below this, a row of punctuations which become granules on the immobile finger: finally, the fingers are crenulate along the whole extent of their opposed edges.

Except that their propodites are sharply carinate, the legs exactly resemble those of *L. longifrons*.

Colours in spirit: light greenish yellow, mottled with darker, and with a dark greenish brown blotch on the posterior part of either branchial region and two white spots on either side of the gastric region.

Size of carapace of an adult male 21 millim. long and 18 millim. broad, of an adult female 22.5 by 20 millim.

37 specimens, young and adult, of both sexes, from the Andamans, are in the Indian Museum collection. In the smallest young the carapace is more elongate and its posterior border is almost straight, its whole shape being very much like that of *L. marmorea*, Bell.

52. *Leucosia pallida*, Bell.

Leucosia pallida, Bell, Trans. Linn. Soc. Vol. XXI. 1885, p. 285. pl. xxx. fig. 2, and Cat. Leucos. Brit. Mus. p. 7: E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 48. (gastric teeth).

Leucosia obscura, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 285, pl. xxx. fig. 3, and Cat. Leucos. Brit. Mus. p. 7.

Leucosia pallida, var. *obscura*, Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 316.

? *Leucosia parvimana*, Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 159.

? *Leucosia moresbiensis*, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 49.

? *Leucosia perlata*, de Man, Notes Leyden Mus. III. 1881, p. 124 : Ortmann, Zool. Jahrbuch Syst. etc., VI. 1892, p. 584.

Carapace more nearly circular than in any other species of the genus, owing to the convexity of the antero-lateral margins; its surface perfectly smooth; its antero-lateral margins crenulate: its *true* postero-lateral margins beaded almost up to the level of the 2nd pair of legs (3rd pereopods); its epimeral edge not visible in a dorsal view; its posterior margin in the adult, as well as in the young, nearly *straight, salient, and having the outer angles dentiform*, the deflexed surface below being quite smooth.

The thoracic sinus is a Y-shaped cavity of no great depth; the tail of the Y being defined by a row of 6 or 7 granules, *three or four of which are large and pearl-like*; the concavity of the fork of the Y being defined by the convex smooth edge of the pterygostomian region; and both limbs of the Y being equally short.

The front is much broader than long *and is distinctly concave in the mid-dorsal line, anteriorly*: it ends in three denticles, the middle one of which is the most prominent.

The ventral surface of the ischium of the external maxillipeds of the female is strongly convex up to a stout terminal tooth.

The upper surface of the arm is traversed, in its proximal half, by 7 to 9 pearly tubercles arranged in two rows running forwards from the basal eminence formed by the usual mass of coalescent granules: the inner edge of the upper surface of the wrist bears a few tiny tubercles: *the hand, which is more than three-fourths as broad as long, has its outer edge strongly carinate*, and its inner edge granular: the fingers meet only at their tips, where alone they are faintly denticulate, their length is four-fifths that of the hand.

Except that they are more slender, and have sharply carinated propodites, and slender very narrow dactyli, the legs are as in *L. longifrons*.

Colours in spirit: delicate lavender grey marbled with darker; a pair of brown spots in the posterior part of the carapace, and two pairs of pale spots in the gastric region.

The carapace of an adult female is 21 millim. long and 18 millim. broad.

In the Indian Museum collection are 3 adult females (one with eggs) from the Andamans, and a young male from the Persian Gulf.

53. *Leucosia corallicola*, n. sp. Plate VI. fig. 4.

Carapace somewhat piriform, longer than broad almost by the whole length of the front: the antero-lateral borders gradually converging, and coarsely crenulate up to the smooth sharp lateral borders of the front: the true postero-lateral border, which is also crenulate, ceases abruptly at the level of the first pair of true legs: the posterior margin is quite straight with the outer angles pronounced: the epimeral edge is only visible dorsally in its posterior part.

The thoracic sinus is deep and distinct, but short and in places ill defined: its longitudinal limb is bounded by 3 or 4 small (small because the species is small) granules above the base of the chelipeds: the edge of the pterygostomian region, which defines it in front, is convex and irregularly wrinkled but not granular.

The front is almost as in *L. longifrons*: it is long, strongly convex dorsally, and ends in a broad triangular somewhat deflexed tip which projects beyond the orbits.

The ventral surface of the ischium of the external maxillipeds is not abnormally convex.

The chelipeds are as in *L. pallida*, as are the legs.

Colours in spirit: light yellow marbled with brownish. The carapace of not quite adult females, and of the males, is 10 millim. long and 8 millim. broad.

Loc. Off Malabar Coast, 29 fathoms on a bottom of "hard flat coral slabs" (Alfred Carpenter).

This species may possibly be Bell's *L. affinis* (Trans. Linn. Soc. Vol. XXI. 1855, p. 287, pl. xxx. fig. 6), but the front and the thoracic sinus are quite different from the figures of that species. It is certainly not the immature form of *L. longifrons*, *L. haswelli*, *L. pallida*, or *L. whitmeei*, to which group it belongs. Among Indian forms its closest relative is *L. pallida* Bell.

54. *Leucosia whitmeei*, Miers.

Leucosia whitmeei, Miers, Ann. Mag. Nat. Hist. (4) XVI. 1875, p. 342, and Trans. Linn. Soc., Zool., (2) I. 1875-79, p. 238, pl. xxxviii. figs. 16-18; J. R. Henderson, Trans. Linn. Soc. Zool., (2) V. 1893, p. 397.

Carapace piriform, longer than broad by the whole length of the front; the antero-lateral borders hardly sinuous, gradually converging, and finely milled; the true postero-lateral border, which is also finely milled, ceases abruptly at the level of the interval between the chelipeds and the first pair of legs; the posterior margin, in the adult, no less than in the young, almost straight, with the external angles somewhat pronounced, the deflexed surface below being quite smooth; the epimeral edge visible to dorsal view only in its posterior part.

The thoracic sinus is a deep hardly Y-shaped cavity, since the outer limb of the Y is greatly produced and the inner limb is very short: the tail of the Y is defined by *two singularly large fungiform or reniform tubercles* with sometimes a third smaller one behind, and the strongly convex edge of the pterygostomian region, which defines the thoracic sinus in front, is finely milled.

The front is prominent, *almost quadrangular, with a sharply transverse sinuous edge and with its dorsal surface, anteriorly, markedly concave.*

The ventral surface of the ischium of the external maxillipeds of the female is broadly carinate up to a strong terminal tooth.

The chelipeds, in the adult male, are very little longer than the carapace. The arm is slender and is ornamented as in *L. pallida*: the wrist is quite smooth: the hand, which is *nearly twice as long as broad and nearly twice the length of the fingers*, has its outer edge carinate and its inner edge sharp: the short fingers meet only at the tip, where alone they are faintly denticulate. The legs are as in *L. pallida*.

Colours in spirit: fawn colour, the front of the carapace sometimes light olive-green; four large round brown spots round the circumference of the carapace behind; two pale spots on either side of the gastric region.

The carapace of the adult male is 14 millim. long and 11 millim. broad; that of the adult female is 13 millim. long and 11 millim. broad.

A young male and 26 adults of both sexes (many of the females with eggs) from the Andamans, are in the Indian Museum collection.

55. *Leucosia whitei*, Bell.

Leucosia whitei, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 289, pl. xxxi. fig. 2, and Cat. Leucos. Brit. Mus. p. 9: Hess, Archiv für Naturges. XXXI. i. 1865, pp. 155, 172: Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 45, and Cat. Austral. Crust. p. 118: Miers, Zool. H. M. S. 'Alert,' pp. 184, 289, and 'Challenger' Brachyura, pp. 322 (footnote), 325: A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 111.

? *Leucosia chevertii*, Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 47, pl. v. fig. 2, and Cat. Austral. Crust. p. 120.

Carapace not appreciably longer than broad, elegantly urn-shaped; its surface smooth, except for (1) a narrow strip of thick short fur clothing its postero-lateral border, (2) a sharp angular granule-tipped eminence springing from the vault of either hepatic region, and (3) a patch of granules just dorsad of the lateral epibranchial angle; its antero-lateral border smooth as far as the front end of the thoracic sinus, and then beaded; its *true* postero-lateral border beaded as far as the level of the base of the 2nd pair of legs (3rd pereopods); its epimeral edge visible in all its extent, dorsally; its posterior margin gently curved,

the inflexed surface below it having numerous punctuations and squamous granules.

The thoracic sinus is a simple cavity defined ventrally by a loop of small somewhat irregular granules, and not very well defined in front.

The front is broader than long, dorsally convex, and its tip, which is truncated pitted and deflexed, ends in 3 broad denticles.

The ventral surface of the ischium of the external maxillipeds of the female is smooth (non-carinate).

The sub-cylindrical arm is closely nodular everywhere except in the middle of the ventral surface; the sub-globular wrist has about half of its upper surface, and a band on the inner edge of its under surface, granular: the hand is inflated, or sub-globular, with its base granular, and its inner edge sharply crenulate: the fingers, which are not much shorter than the hand, meet only at their tips, where alone they are denticulate.

The legs are compressed: the meropodites, which are much compressed, are finely granular along the edges; the carpopodites and propodites are sharply carinate, dorsally; the dactyli, which are nearly as long as their propodites and carpopodites together, are narrowly lanceolate.

The abdomen of the female consists of 4 pieces, and the large third piece is again subdivided into 3 pieces by two deep furrows which, however, are broadly interrupted in the middle line.

A single egg-laden female from the Andamans has the carapace 14 millim. long and 13.5 millim. broad.

The colours, according to Bell, are light brown with small angular red spots on the carapace, and a large red spot on the upper surface of the hand.

Our single specimen, which has been in strongly carbolized spirit for over 20 years, is now an uniform stone grey.

56. *Leucosia cumingii*, Bell.

Leucosia cumingii, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 290, pl. xxxi. fig. 3, and Cat. Lencos. Brit. Mus. p. 9.

Carapace quite devoid of marginal fur, a little broader than long, the inequality being hardly appreciable in the adult female, elegantly hexagonal as in the preceding species. The antero-lateral border, the main curve of which would be slightly concave, is convex by reason of the strongly marked angular projection of the hepatic region. The antero-lateral margin may be obscurely milled just in front of its junction with the *true* postero-lateral border, *but the latter, as well as the posterior margin, is quite smooth*: the posterior margin is gently curved, and in the male prominent.

The thoracic sinus is a deep obscurely Y-shaped cavity full of hair, the tail of the Y being defined by a row of 5 flat pearly granules situated above the chelipeds, the inner limb of the Y being very short, and the outer limb of the Y being produced up to the antero-lateral border to accent the boundary between the hepatic and branchial regions, the concavity of the fork of the Y being sharply defined by the smooth convex edge of the pterygostomial region.

The front is broader than long, deflexed and obscurely bilobed at tip, and a little concave in the mid-dorsal line anteriorly.

The ventral surface of the ischium of the external maxillipeds of the female is perfectly flat.

The edges of the trigonal arm are tuberculate: on the upper surface of the arm two short rows of tubercles arise from a mass of granules and short hairs at the base of the arm, and run, one towards the inner, one to the outer, edge of the arm: the wrist and the hand are quite devoid of granules: the fingers are nearly as long as the hand, and meet only at the tips.

The legs have all the joints compressed but not dilated.

The abdomen of the male consists of 4 pieces, that of the female of 3 pieces only.

Colours in spirit: yellowish white with yellowish brown markings, the hand and the fingers each with a brownish cross-band, the abdomen of the female with brownish yellow markings in its anterior (true posterior) third.

A male and an egg-laden female from the Nicobars: the carapace of the male is 11 millim. long and 10 millim. broad, that of the female is 12×11·5 millim.

57. *Leucosia sima*, n. sp. Plate VI. fig. 5.

Very closely related to *L. cumingii*, but differs from it, and from all other species of the genus, in the length of the posterior margin of the carapace, which is considerably more than half the greatest breadth of the carapace. Its form therefore would be broadly hexagonal, but owing to the shortness of the front and to the great convexity of the hepatic regions, it almost forms a pentagon.

Besides in the form of the carapace, which is unique in the genus, it differs from *L. cumingii*, Bell, only in the following characters, adult females being compared:—

1. The front hardly breaks beyond the general convexity of the anterior half of the carapace owing to the still greater angular prominence of the hepatic regions.

2. The antero-lateral margin of the carapace behind the angular

prominence of the hepatic region, and the postero-lateral margin up to the level of the base of the 1st pair of legs, are distinctly beaded.

3. The thoracic sinus has no definite boundary in front, although it is deep and defined ventrally by large pearly granules as in *L. cumingi*.

4. The inner edge of the upper surface of the wrist bears a row of granules, which is continued on to the base of the hand.

5. *The fingers are only half the length of the hand.*

An adult egg-laden female from Bombay has the carapace 13 millim. long and 13 millim. broad.

58. *Leucosia elata*, A. Milne Edwards.

Leucosia elata, A. Milne Edwards, Nouv. Archiv. du Mus. Vol. X. 1874, p. 41, pl. ii. fig. 2.

Carapace as broad as long, hexagonal, with the antero-lateral borders strongly convex and smooth: the true postero-lateral border is clothed with a strip of dense dark-coloured fur: there are also a few scattered stiff hairs on the posterior part of the epibranchial regions.

The thoracic sinus is a simple cavity, deep, sharply defined anteriorly, containing a good many hairs and a line of tiny granules, besides the row of 2 or 3 larger pearly granules (situated above the base of the chelipeds) which define it ventrally.

The front is prominent, broader than long, concave in the mid-dorsal line and distinctly bilobed.

The arm is markedly trigonal *with the antero-external angle expanded*, its upper surface is bounded internally by a row of pearly tubercles, externally by a row of pearly granules, and is otherwise smooth, except for a few granules almost hidden in hair and a single larger tubercle at its base. The wrist is smooth and subglobular, with obscure traces of carination along its outer surface. The hand is a little longer than broad and has its outer edge strongly carinate, the carina being continued on the mobile finger, where, however, it is less marked: the little lobule at the base of the inner margin of the hand is beaded all round its edge. The fingers, which are not much shorter than the hand, meet only at the tip, and have their opposed edges smooth throughout.

The legs are much compressed, and have the carpopodites strongly carinate dorsally, the propodites strongly carinate dorsally and ventrally, and the dactyli extremely slender and hardly as long as their propodites: the meropodites also of the last pair are carinate dorsally.

Colours in spirit: porcelain white or pale yellow. M. A. Milne Edwards describes the colours as bright greenish grey with numerous specks of orange red.

Besides a specimen from Upolu purchased from the Museum

Godeffroy, there are, in the Indian Museum collection two apparently adult males dredged, one off the south coast of Ceylon in 34 fathoms, and the other from the Persian Gulf.

The carapace of the latter is 8·5 millim. long and 8·5 millim. broad.

59. *Leucosia hæmatosticta*, Adams and White.

Leucosia hæmatosticta, Adams and White, Zool. 'Samarang,' Crust. p. 54, pl. xii. fig. 2: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 289, and Cat. Lencos. Brit. Mus. p. 8: Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 160: Miers, P. Z. S. 1879, pp. 20 and 40: A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 111.

Carapace sharply hexagonal, elegantly urn-shaped, its breadth equal to its length; its surface smooth except for a strip of thick short harsh white fur, which extends from the lateral epibranchial angle along the whole length of the *true* posterior border; its antero-lateral borders slightly concave and smooth, or very faintly milled; its *true* postero-lateral border ending abruptly at the level of the base of the second pair of legs (3rd pereopods); its thickened milled epimeral edge, which is continuous with the posterior margin and ends at a sharp tooth just behind the base of the chelipeds, is visible, dorsally, in all its extent, when the carapace is held, without any inclination, straight in front of the observer's eyes; its posterior margin perfectly straight, with the outer angles well defined, and with the deflexed surface below it perfectly smooth.

The thoracic sinus is a simple cavity, defined in front by the smooth, very oblique, slightly convex edge of the pterygostomial plate: it is more or less filled with hair and is devoid of granules large enough to be seen with the naked eye.

The front is prominent, dorsally convex, much broader than long, and has its sinuous front margin strongly deflexed.

The chelipeds in the adult male are about one half as long again as the carapace. The upper surface of the trigonal arm has a single line of tubercles along its inner border, and a partly-fused double row along its outer border; at its base are some small tubercles hidden in a well-defined patch of encrusting spongy pubescence, of a whitish colour, from which two or three tubercles run forward to the inner border. The ventral border of the arm is tubercular, the tubercles arising somewhat profusely in a dense patch of spongy pubescence; the inner and under surfaces are quite smooth. The wrist is smooth, except for one or two tiny granules along its inner edge. The hand is a little longer than broad, its inner surface has a single row of granules, which is continued some way along the immobile finger. The fingers are about as long as the hand, and are somewhat hairy: their opposed edges

are crenulate along the distal two-thirds, the crenulation being most marked on the immobile finger.

The legs have the meropodites compressed, and concave on the ventral surface, the concavity being defined by two prominent longitudinal lines of granulation; the carpopodites dorsally subcarinate, but not dilated; the propodites carinate both dorsally and ventrally, but not dilated; and the dactyli narrowly lanceolate, and nearly as long as their carpopodites and propodites combined.

The abdomen of the male consists of 4 pieces, the third piece having a strong tooth in the middle line: that of the female consists of only 3 pieces.

Colours in life and in spirit: front pinkish-grey; the rest of the carapace ivory white covered with roundish crimson spots, which may be scattered, or may form a definite network: thoracic sterna, abdominal terga and external maxillipeds with similar spots; and a few similar but larger spots on the upper surface of all the joints of the chelipeds: legs banded with crimson.

In the Museum collection are two adult males and a half-grown female from the Madras side of Palk Straits, in 12 fms. and upwards.

The carapace of the largest male is 12.5 millim. long and 12.5 millim. broad.

60. *Leucosia margaritata*, A Milne Edwards.

Leucosia margaritata, A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 42, pl. ii. fig. 3.

Differs from *L. hæmatosticta*, Ad. and Wh., only in the following particulars:—

1. Its size is even smaller, the carapace in the adult of either sex measuring only 8.5 millim. in length and 8.5 millim. in breadth.

2. The spongy pubescence on the base of the chelipeds, and the fur along the postero-lateral edge of the carapace are coal-black.

3. The hepatic regions are indicated by faint bulgings above the antero-lateral border.

4. The thoracic sinus is much shallower, being, in fact, almost obsolete.

5. The upper surface of the arm is bounded both in front and behind by two rows of pearly tubercles.

6. On the ventral surface of the basal joint of the external maxillipeds there is a sharp stout tooth, and another on the ventral surface of the ischium joint of the female.

7. Colours in spirit: old ivory white, the carapace and chelipeds elegantly reticulated with bright reddish brown.

In the Indian Museum collection are two adult males and an adult female laden with eggs. All came from an encrusted bottom of shells and shingle; one from the Andamans, one from the Malabar coast at 26-31 fms., and one from the Coromandel coast at 18 fms.

61. *Leucosia craniolaris*, (Herbst.)

?? *Cancer craniolaris*, Linnæus, Mus. Lud. Ulr. p. 431, and Syst. Nat., 12th ed., p. 1041.

Cancer craniolaris, Herbst, Krabben, I. ii. 90, pl. ii. fig. 17; and (?) Fabr. Ent. Syst. II. 441.

Leucosia craniolaris, Fabr. Ent. Syst. Suppl. p. 350: Leach, Zool. Misc. III. p. 21: Milne Edwards, Hist. Nat. Crust. II. 122: Bell, Trans. Linn. Soc. 1855, p. 283, and Cat. Leucos. Brit. Mus. p. 6: Miers, 'Challenger' Brachyura, p. 325, pl. xxvii. fig. 3: A. O. Walker, Journ. Linn. Soc. Zool. Vol. XX. 1890, p. 111: J. R. Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 397.

Leucosia craniolaris, var. *lævimana*, Miers, Zool. H. M. S. Alert, pp. 184 and 250, pl. xxvi. fig. A.

Carapace rather sharply hexagonal, about six-sevenths as long as broad: its surface perfectly smooth and devoid of hair: its antero-lateral borders finely beaded, almost straight, and gradually converging to join the sides of the truncate-triangular front without any abrupt break: its true postero-lateral border beaded, the beading ending rather abruptly at the level of the base of the first pair of legs (2nd pereopods): its thickened milled epimeral edge, which is continuous with the posterior margin and ends at a sharp tooth just behind the base of the chelipeds, is visible, dorsally, in all its extent when the carapace is held, without any inclination, straight in front of the observer's eyes: its posterior margin is almost straight and finely beaded, and the deflexed surface below it is covered with rows of sharp granules.

The thoracic sinus is a deep cavity full of hair, and—when denuded—is devoid of any tubercles or granules visible to the naked eye: it is bounded in front by the finely beaded, or milled, convex edge of the pterygostomial plate, so as to end in two broad notches of nearly equal size. The convexities of the hepatic regions are an indistinguishable part of the general convexity of the carapace.

The front is prominent, dorsally convex, and truncate triangular; its length is less than its breadth; and it ends in five prongs, the outer of which on either side are the sharp external orbital angles, and the middle one of which is by far the most prominent.

The ventral surface of the ischium of the external maxillipeds, in the female, is strongly convex up to a strong terminal tooth.

The chelipeds, in the adult male, are two-thirds longer than the carapace: the trigonal arm has beaded edges, the beading failing at the distal end of the outer border, and being spread out and profuse at the

proximal end of the ventral border: all the surfaces of the arm, however, are practically smooth, for although there are a few small tubercles at their proximal ends, these are covered and almost concealed by a dense adherent encrusting spongy pubescence, which is specially well marked on the upper surface. The surface of the wrist is quite smooth, except for two or three tiny granules along the inner edge of the upper surface. The hand is nearly as broad as long, and its inner surface is bounded by two prominent longitudinal rows of sharp-cut bead-like granules, which are continued some way along the immobile finger. The fingers are nearly as long as the hand, and are stoutly denticulate along the whole extent of their opposed edges.

The legs have the meropodites much compressed, those of the first three pairs being sharply squared, with four sharp longitudinal lines of granules, and those of the last pair being broadened and carinated ventrally as well as dorsally; the carpopodites, in all, are compressed and strongly carinate dorsally; the propodites are compressed and strongly carinate both dorsally and ventrally; and the dactyli are broadly lanceolate.

The abdomen, in the male, to external view, consists of only 3 distinct pieces, the second piece bearing a tiny denticle in the middle line.

Colours in spirit: stone blue with indefinite longitudinal stripes of darker hue; chelipeds, above, livid purplish-blue; legs yellowish.

The carapace of an adult male is 23 millim. long and 20 millim. broad; of an adult female, 21.5 millim. long and 19 millim. broad.

In the Museum collection are 2 adult males and 3 adult females from the mouth of the R. Hooghly.

62. *Leucosia vittata*, Stimpson.

Leucosia vittata, Stimpson, Proc. Acad. Nat. Sci. Philad., 1858, p. 159.

Differs from *L. craniolaris*, adults of both sexes being compared, only in the following particulars:—

1. The antero-lateral borders are distinctly emarginate behind the hepatic regions, the emargination being caused by the encroachment of the outer limb of the thoracic sinus, and being plainly visible, dorsally, when the carapace is held, without any inclination, straight in front of the observer's eyes.

2. The hand is very appreciably longer than broad, and the fingers are every bit as long as the hand.

3. The colours in spirit are: carapace blackish blue, or nearly black, with flame-coloured stripes; chelipeds from the distal fourth of the arm to near the tips of the fingers, smoky flame-coloured on both surfaces, as are also the legs; under surface of body ruddy brown.

In size similar to *L. craniolaris*.

Two adult males, an adult female, and a young female from the Andamans are in the Indian Museum collection.

In the young one the posterior margin of the carapace is perfectly straight, with the outer angles dentiform.

63. *Leucosia pubescens*, Miers.

Leucosia pubescens, Miers, Trans. Linn. Soc., Zool., (2) I. 1875-79 (1877), p. 238, pl. xxxviii. figs. 22-24: Haswell, P. L. S., N. S. Wales, Vol. IV. 1879, p. 46, and Cat. Austral. Crust. p. 119: de Man, Archiv. für Naturges. LIII. i. 1887, p. 390.

? *Pseudophilyra hoedtii*, de Man, Notes Leyden Mus. III. 1881, p. 125.

Pseudophilyra hoedtii, de Man, Journ. Linn. Soc. Zool. Vol. XXII. 1888, p. 198.

Differs from *L. craniolaris* Herbst, only in the following particulars:—

1. The front is as long as broad, and its sides meet the antero-lateral borders of the carapace at an angle.

2. The inflexed surface below the posterior margin of the dorsum of the carapace is quite smooth.

3. The thoracic sinus, when denuded of its hair, is a shallow cavity, and the edge of the pterygostomian region which bounds the sinus anteriorly is thickened, smooth, and little convex.

4. The inner edge of the hand is almost devoid of granules.

5. The meropodites of the first three pairs of legs are rounded, not sharply squared, and usually have only a single longitudinal row—ventral in position—of minute granules: those of the last pair, though compressed, are not carinate, except that ventrally, about the middle, they bear a serrated lobule.

6. The carpopodites of the legs are inflated and non-carinate, and the propodites are but slightly carinate.

7. In fresh spirit specimens the carapace is light slate blue, traversed longitudinally by four broken longitudinal stripes of greenish brown which are so far continuous as to form a treble loop something like an incomplete pair of spectacles or a rather fantastic U: the chelipeds and legs with bands of yellowish brown, and the base of the fingers yellowish brown. In old spirit specimens the markings are not found on the carapace.

The carapace of an adult male is 18 millim. long and 15 millim. broad, that of an adult female is 18.5 millim. by 15 millim.

In the Indian Museum collection are 3 adult males and 2 adult females from the Madras Coast, two adult females and a young male from the Persian Gulf, an adult and a half-grown male from the

Andamans, and young males from Palk Straits, Mergui (and Hong-kong).

The young male from Mergui has been named *Pseudophilypira hoedtii* by Dr. de Man.

64. *Leucosia truncata*, n. sp. Plate VI. fig. 6.

Differs from *L. pubescens*, ovigerous females compared, *only* in the following characters :—

1. The front is broad and so extremely short that its free edge does not project beyond, indeed barely projects as far as, the epistome.
2. The thoracic sinus is extremely shallow, but yet is a distinct sinus, with a row of minute granules above the base of the chelipeds.
3. The dactyli are palmulate.
4. A distinct line of sharp cut beads bounds the inner edge of the wrist and of the hand.

Two adult (ovigerous) females from the Orissa coast. The colouration is exactly similar to that of *L. pubescens*, but darker.

The first specimen that I saw I regarded, after careful examination, as either a malformation of *L. pubescens*, or a specimen of *L. pubescens* that had had its front broken and imperfectly repaired. But a second ovigerous female of exactly similar form, from another dredging station, now leads to the conclusion that, instead of being malformations, these two specimens must represent either a new species of the *L. craniolaris* and *rhomboidalis* type, or possibly may belong to the *L. porcellana* of Fabricius, which de Man states definitely is a true *Leucosia*.

At any rate the species here under consideration is a genuine *Leucosia*, and not a *Pseudophilypira* or *Philypira*.

65. *Leucosia rhomboidalis*, De Haan.

Leucosia rhomboidalis, DeHaan, Fann. Japon. Crust. p. 134, pl. xxxiii. fig. 5: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 284, and Cat. Leucos. Brit. Mus. p. 6: F. Muller, Verh. Ges. Basel, VIII. p. 472: A. Ortmann, Zool. Jahrbüch. Syst. etc., VI. 1892, p. 586.

? *Leucosia craniolaris*, Desmarest, Consid. Gen. Crust., p. 167, pl. xxvii. fig. 2.

Leucosia maculata, Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 159.

Differs from *L. craniolaris* Herbst, only in the following particulars, adults of both sexes being compared :—

1. Its size is very much smaller: the carapace of the adult, in our series of 23 specimens, is never more than 16 millim., and is usually about 14 millim. long.
2. The front, which is as long as broad, has its sides subparallel

and hence forming a very abrupt angle with the antero-lateral borders of the carapace: it ends in 3 teeth, of which the two outer are small and deflexed and only the middle one is large and prominent. As, also, the external orbital angles are inconspicuous, the front, when examined without a lens, seems to end in a single sharp point, as shown in De Haan's figure.

3. The thoracic sinus, when denuded of its hair, is a shallow cavity, and the edge of the pterygostomian region that forms its anterior boundary is thickened, smooth, and almost straight.

4. The chelipeds of the adult male are less than half again as long as the carapace.

5. The inner surface of the wrist is bounded both above and below by a line of granules.

6. Colours in spirit: carapace and dorsal surface of chelipeds blue-black; the carapace with two divergent crescents of dark red spots in its anterior half, following the anterior boundary of the epibranchial regions; tips of arms hands and fingers sometimes nearly white, bases of fingers sometimes yellow.

17 adults of both sexes (including females with eggs) from the Coromandel coast in 13 to 28 fathoms, and an adult male and female from the Andamans (besides 4 adults from Hongkong) are in the Indian Museum collection.

66. *Leucosia phyllochira*, Bell.

Leucosia phyllocheira, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 291, pl. xxxi. fig. 5, and Cat. Leucos. Brit. Mus. p. 9.

This species has a piriform carapace, and is distinguished from all its congeners by the following characters:—

1. The chelipeds are shorter than the carapace.

2. The arms have their upper surface much expanded.

3. The hands are broader than long, are foliaceous, and have both their inner and outer edges strongly carinate.

A single small specimen from Palk Straits is in the Indian Museum collection.

Onychomorpha, Stimpson.

Onychomorpha, Stimpson, Proc. Acad. Nat. Sci., Philadelphia, 1858, p. 162.

Carapace shaped much like a human nail, depressed, with all its margins, behind the front, forming a continuous laminar brim, increasing in breadth from before backwards and beneath which the true legs are almost entirely concealed in flexion: the expansion of the posterior

margin is particularly broad: the regions of the carapace are not delimited. Front short, hardly projecting beyond the general outline of the carapace, but projecting well beyond the edge of the buccal cavern. Eyes minute: orbits with a long suture in the roof, and a small gap at the inner canthus, but complete and affording complete concealment to the eyes: the floor of the orbit is closely appressed to the roof of the buccal cavern. Antennules folding a little obliquely. Antennæ obsolete.

Buccal cavern longer than broad: the exopodite of the external maxillipeds is elongate, and not much broader than the endognath, and has its outer edge a little curved: the acutely triangular merus of the endognath projects beyond the exognath, and is much longer than the ischium, measured along the inner edge.

The chelipeds, compared with the legs, are very massive: they are depressed and laminar, and are about the same length as the carapace: the fingers are stout, compressed, and very short.

The legs are slender and compressed, and when flexed are almost entirely concealed beneath the expanded edge of the carapace.

67. *Onychomorpha lamelligera*, Stimpson.

Onychomorpha lamelligera, Stimpson, Proc. Acad. Nat. Sci. Philad., 1858, p. 162: A. O. Walker, Journ. Linn. Soc. Zool. XX. 1890 (1887), p. 111, pl. viii. fig. 3.

Carapace triangular with the sides slightly curved, a little longer than broad; depressed, laminar, and unguiform owing to the preponderance of the broad laminar brim, to which the true carapace (the part lodging the viscera) forms a low convex circular crown.

The surface of the carapace is smooth, without any indication of regions: the edge of the brim is elegantly striated. The under surface of the body is also quite smooth, except for the striations all round the edge of the carapace.

The front is a little recurved upwards.

The chelipeds, in the female, are a very little longer than the carapace: the arm is sharply trigonal, with the outer edge cristiform, the edge of the crest being finely striated like the edge of the carapace: the outer edge of the wrist is carinate, and a ridge traverses the upper surface of the wrist: the hand is laminar with the edges sharp and striated beneath a copious spongy pubescence; it is rather more than half again as long as broad, and more than twice as long as the compressed fingers.

The legs are short and slender, with the merus, carpus and propodite carinated, and the dactylus almost filiform.

In the female all the segments of the abdomen except the last appear to be fused together, although the first and second can be recognized.

The carapace of an apparently adult female is 7 millim. long, and 6.5 millim. in greatest breadth.

A single female occurs in the collection of the Indian Museum,—from Palk Straits.

Philyra, Leach.

Philyra, Leach, Zool. Miscell. III. p. 18.

Philyra, Milne Edwards, Hist. Nat. Crust. II. 131.

Philyra, Bell, Trans. Linn. Soc., Vol. XXI. 1855, p. 299, and Cat. Leucos. Brit. Mus. p. 13.

Philyra, Miers, 'Challenger' Brachyura, p. 320.

Philyra can be at once distinguished from *Leucosia* by the absence of a thoracic sinus, and from *Pseudophilyra* by the fact that the front is broad and either not all produced to form a *Leucosia*-like snout, or if so produced (as it is, to some extent, in *Philyra platychira*) then the side-wall of either hepatic region forms an independent marginal facet.

Carapace usually circular and somewhat depressed, with the epistome projecting beyond the broad front; the dorsal surface of the carapace is generally bounded by a continuous beaded line; the hepatic and branchial regions usually fairly well defined by grooves or creases.

Buccal orifice transversely oblong, with the anterior angles broadly rounded: the exognath broadly dilated, usually foliaceous, the outer and anterior borders forming parts of one wide curve: the merus of the endognath narrowly and acutely triangular, the length of its inner border being not less, or not much less, than that of the inner border of the broad ischium.

Orbits small and sunken, with two sutures in the upper and outer wall, and a hiatus at the inner angle, where the minute antennal flagellum stands. The antennules fold transversely.

Chelipeds symmetrical and, relatively to the legs, very massive; longer in the male—about twice the length of the carapace—than in the female: true legs small.

The abdomen of the male consists of 3 or 4 pieces, that of the female of 4.

Key to the Indian species of *Philyra*.*

I. Carapace circular, never carinate or covered with pubescence dorsally : upper surface of chelipeds never longitudinally carinate :—

1. The epistome and the lower border of the marginal hepatic facet form a lobe that projects far beyond the front, like the lower jaw of a bulldog :—

i. Carapace as long as broad, its surface only partly, and very variably granular : chelipeds of adult male more than twice as long as the carapace

P. scabriuscula.

ii. Carapace a little broader than long, its surface always completely covered—except sometimes on the tip of the front—with beadlike granules : chelipeds of the adult male much less than twice the length of the carapace

P. verrucosa.

2. The epistome projects either very slightly in all its extent, or not in its entire extent, beyond the front :—

i. The sidewall of the hepatic region forms, on either side, an independent facet on the antero-lateral margin of the carapace : the margin of the epistome is deeply cleft on either side, below the eye ; hands between 2 and 3 times as long as broad, fingers with their opposed edges toothless

P. platychira.

ii. The sidewall of the hepatic regions is not flattened to form a facet : the margin of the epistome not cleft below the eye : hands never twice as long as broad, fingers denticulate :—

a. The carapace is almost smooth to the naked eye : the regions of the carapace are hardly defined :—

a. The whole of the epistome projects beyond the front, which is hardly pubescent : the beads on the line that defines the circumference of the carapace are of uniform small size : terminal segment of the exognath roughly semicircular : hands not inflated, fingers not strongly bent inwards in the male : sixth abdominal tergum quite smooth

P. globosa, (Fabr.)

β. Only the internal angles of the afferent branchial orifices project beyond the front, which is hairy : some of the marginal granules of the carapace are enlarged and almost dentiform, at fairly regular intervals : terminal segment of the exognath ovally, and very elegantly, foliaceous : fingers, in the male, strongly bent inwards : sixth abdominal tergum, in the male, with a small median denticle

P. globulosa, Edw.

P. corallicola.

b. The regions of the carapace form independent swellings, the convexities of which are closely covered with large vesiculous granules

P. serangula.

II. Carapace sharply hexagonal, the posterior margin quite straight and the posterior angles dentiform : traversed fore and aft by a median carina, and with an oblique carina on either branchial region : upper surface of chelipeds traversed—from base of arm to finger-cleft—by a sharp ridge

* Dr. Henderson includes *Philyra adamsii* Bell (Trans. Linn. Soc. Vol. XXI. 1853, p. 301, pl. xxxiii. fig. 1) in the Indian Fauna. I have not given it a place in this Key because, from the figures and description, I cannot satisfy myself that it is really a *Philyra*. It seems to me to be, rather, a *Pseudophilyra*.

68. *Philyra scabriuscula*, (Fabr.)

Seba, III. pl. xix. figs. 10, 11.

† *Cancer cancellus*, Herbst, Krabben, I. ii. 94, pl. ii. fig. 20.

Leucosia scabriuscula, Fabricius, Ent. Syst. Suppl. p. 349 : Latreille, Hist. Nat. Crust. et Ins. VI. 116.

Philyra scabriuscula, Leach, Zool. Miscell. III. p. 22 : Desmarest, Consid. Crust. p. 167 : Milne Edwards, Hist. Nat. Crust. II. 132, pl. xx. figs. 9, 10 : Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 299, and Cat. Leucos. Brit. Mus. p. 14 : Heller, 'Novara' Crust. p. 70 : de Man, Notes Leyden Mus. III. 1881, p. 126 : Lenz and Richters, Abh. Senck. Ges. XII. 1881, p. 425 : Muller, Verh. Ges. Basel, VIII. 1886. p. 473 : de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 201 : J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 399.

The epistome and the subhepatic regions form a dorsally-flattened, marginally-crenulate, rounded lobe, which is separated from the anterior curve of the carapace by a groove and projects far beyond the front, like the lower jaw of a bulldog.

The carapace is discoidal, with the margin beaded and the dorsal surface very variably ornamented with vesicular granules visible to the naked eye: these, however, never completely cover the carapace, and are rarely altogether absent, but are generally confined to the outer part of the branchial regions and to the branchio-cardiac grooves, which are broadly defined. The hepatic regions also are defined, by a slight marginal indentation and by a dorsal wrinkle.

The front is divided into two lobes by a deep broad groove, and the roof of the orbit is deeply fissured, so that the external orbital angle is acutely emphasized.

The edges of the thoracic sterna and the basal edge of the abdomen, as well as the greater part of the pterygostomian regions, are ornamented with polished granules; but the surface of the external maxillipeds is perfectly smooth, except in the female, where there are traces of granulation on the endopodite.

The chelipeds in the adult male are about $2\frac{1}{2}$, in the adult female about $1\frac{1}{2}$, times the length of the carapace: the arms bear rows of beadlike granules running along the upper and inner surfaces but fading away distally; the under surface of the arm is almost smooth: the inner edge of the wrist has a single row, and the inner edge of the hand several rows, of minute vesicular granules, which are hardly visible to the naked eye even in the male, and are obsolescent in the female. The hands are twice as long as broad: the fingers, although they meet only at their extreme tip, are denticulate all along the opposed edges; the mobile finger is nearly as long as the hand.

The legs are slender and smooth, except for a line of microscopic granulation along the under surface of the meropodites.

The abdomen of the adult male consists of two linear and hidden basal pieces, a triangular apical piece, and a long triangular middle piece in which the division of the 6th tergum is marked by a faint transverse groove.

The diameter of the carapace of the adult male is 12 to 14 millim., of the adult female about 10 millim.

Colours in spirit: carapace mottled with dull brown and greenish shades; chelipeds distinctly and legs indistinctly banded with dull brown.

In the Indian Museum collection are 110 specimens from Tavoy, Mergui, Madras coast, Travancore coast, Karáchi, Mekrán coast, and Persian Gulf.

1. A variety from Madras—represented by a single male—has the greater part of the carapace covered with granules, four of which—one in the mid-gastric, one in the mid-cardiac, and one on either branchial region—are much enlarged; and has chelipeds a good deal less than twice the carapace in length.

2. A variety from the Nicobars—also represented by a single male—has the whole carapace, except the front and the anterior limit of the gastric region, very closely covered with large granules much as in the next species.

69. *Philyra verrucosa*, Henderson.

Philyra verrucosa, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 399, pl. xxxvii. figs. 10-12.

Differs from *P. scabriuscula*, (Fabr.), adults of both sexes being compared, only in the following characters:—

1. The carapace is irregularly oval rather than discoidal, especially in the female, owing to the greater lateral bulging of the branchial regions.

2. The whole dorsal surface of the carapace, except sometimes the front, is closely covered with beadlike granules, which are larger posteriorly, and one of which—somewhere near the middle—is usually enlarged.

3. A slight transverse dorsal indentation separates the hepatic from the branchial region on either side, but there is no independent dorsal bulging of the latter.

4. The branchio-cardiac grooves are narrow and deep.

5. The front is divided into two lobes by a broad shallow groove: the fissure in the roof of the orbit is indistinct, so that the external orbital angle is not sharply pronounced.

6. The whole surface of all the thoracic sterna is closely beaded, and the surface of the exopodite as well as of the outer half of the endopodite of the external maxillipeds is granular.

7. The chelipeds, in the adult male, are less than twice the length of the carapace: the distal end of the upper surface of the arm is covered with granules, and the greater part of the under surface of the arm is granular: the wrist and hand of the male have, along their inner edge, a row of granules quite visible to the naked eye: the hand is only half again as long as broad.

8. The size is a good deal smaller—the carapace of the adult male being about 9 millim. long and 10 millim. broad, that of the adult female being about 8 millim. long and 9 millim. broad.

9. Colours in spirit: dorsum blue-black, with a coppery tinge which is most marked on the chelipeds.

12 adults (male and female) from off Puri, 10 fathoms, from Madras, and from Karáchi, are in the Indian Museum.

70. *Philyra sexangula*, n. sp. Plate VII. fig. 2.

The whole exoskeleton, excluding the tips of the fingers and dactyli, is closely covered with a short close microscopic velvet-like pubescence—both dorsally and ventrally.

Carapace as long as broad, sharply hexagonal, traversed fore and aft by an interrupted median carina: the branchial regions are also traversed obliquely backwards each by a carina which terminates on either postero-lateral margin at a sharp eminence. The straight posterior margin has its outer angles strongly dentiform.

The side wall of either hepatic region forms an independent facet, which also involves the front and thus presents a condition intermediate between that of *P. platychira* and *P. scabriuscula*.

The edge of the front is straight and bilobed, and the straight edge of the epistome projects beyond it. There is a slight notch in the edge of the epistome beneath the eye on either side.

The chelipeds in the adult male are nearly $2\frac{1}{2}$ times as long as the carapace; their upper surface, from the base of the arm to the finger cleft, is traversed by a sharp ridge; they are devoid of any granules visible through the general velvet: the hand is twice as long as broad, and the fingers are rather over two-thirds the length of the hand and have their opposed edges finely denticulate and hairy: the inner edge of the upper surface of the hand is traversed by a second sharp ridge.

The legs are slender and compressed, the under edge of their propodites and dactyli being fringed with long hairs.

The abdomen of the male appears to consist of only two pieces, namely a small apical piece, and a long triangular plate in which the 6th tergum is marked off by a groove and bears a strong median tooth.

The diameter of the carapace of the male is 8 millim.

Colours uniform blackish brown everywhere above and below.

Loc. Godávári coast, Sacramento shoal, 6 fms., a single male: and Persian Gulf, a male.

In the specimen from the Persian Gulf the surface of the carapace beneath the velvet-like pubescence is uniformly punctulate in honey-comb fashion; and the edges of the carapace, the epibranchial carinæ, and the edges of the chelipeds and of their longitudinal ridge, as also of the second ridge along the inner edge of the hand, are all evenly granular. A near ally of this little species appears to be *P. punctata*, Bell.

71. *Philyra platychira*, De Haan.

Philyra platychira De Haan, Faun. Japon. Crust. p. 132, pl. xxxiii. fig. 6: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 300, and Cat. Leucos. Brit. Mus. p. 15: Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 160: E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 49 (*gastric teeth*): Miers, 'Challenger' Brachyura, p. 321: de Man, Journ. Linn. Soc., Zool., XXII. 1888, p. 201: J. R. Henderson, Trans. Linn. Soc. Zool., (2) V. 1893, p. 400.

Philyra longimana, A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 43, pl. ii. fig. 4: Miers, 'Challenger' Brachyura, p. 321.

Carapace convex, subcircular, but pinched in to form an independent marginal facet in either hepatic region: the circumference is beaded, as also—but less distinctly—are the margins of the lateral hepatic facets: the surface of the carapace, to the naked eye, is almost always quite smooth: the branchio-cardiac grooves are distinct.

The edge of the front is almost straight and is broadly bilobed, the whole of the epistome projects beyond it. The edge of the epistome is deeply cleft just below the eye, on either side.

The thoracic sterna have the edges, and the first sternum the surface also, beaded or granular.

The external maxillipeds have the surface smooth, and the edges of certain of their segments finely and inconspicuously fringed as in *P. globosa* (Fabr.), only the hairs on the inner edge of the endognath of the female being conspicuous: the distal segment of the exognath is less dilated than in any other Indian species.

The chelipeds in the adult male are $2\frac{1}{2}$ times, in the adult female $1\frac{5}{6}$ times, the length of the carapace: the arms have a few rather distant small vesicular granules on the basal third of, and also along the inner border of, the upper surface, and on the base and along the lower border of the inner surface, besides other tiny granules only visible with a lens: the surfaces of the wrist and hand are smooth. The hand is thin—

almost lamellar—with sharp edges, the inner of which is finely crenulate; in the adult male its length is nearly three times its breadth. The fingers, which are not as long as the hand, are also very thin and lamellar, and are elegantly curved: their opposed edges are sharp and *entire*, the cutting edge of the immobile finger being rather thickly fringed with hair.

The legs are slender and smooth, except for a line of tiny granules along the under surface of the meropodites.

The abdomen of the male consists of a single linear and concealed basal piece and a small triangular terminal piece, and, between the two, a long smooth triangular piece, which is bilobed and granular at base and has the sixth tergum demarcated by a deep groove.

The colour in spirit is uniform coppery.

The carapace of the adult male is 13 or 14 millims. in either diameter, that of the female 12 or 13.

In the Indian Museum collection are 40 specimens, adults and young of both sexes, from the Andamans, Mergui, Karáchi, and the Persian Gulf.

The Persian Gulf specimens, which are quite adult, have the dorsal surface much mottled with green and brown, and the immobile finger denticulate beyond the line of hair.

72. *Philyra globosa*, Fabr., de Man.

Philyra globosa, de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 202: *only that part referring to Fabricius' female type and to the Mergui specimens*. This reference is placed first because Dr. de Man has examined Fabricius' types, male and female, of *P. globosa*, and the species here under consideration corresponds with Fabricius' female type as re-described by de Man.

?? Rumph, Amboin. Rariteitk. pl. x. fig. D.

Cancer globosus, Fabr., Sp. Insect. I. 497 and Ent. Syst. II. 441.

? *Cancer globus*, Herbst, Krabben, I. ii. 90.

Leucosia globosa, Fabr. Ent. Syst. Suppl. p. 349: Latreille, Hist. Nat. Crust. et Ins. VI. 117.

? *Philyra globosa*, Leach, Zool. Miscell. III. 22 (reference to male); and (?) Desmarest, Consid. Crust. p. 163.

? *Cancer porcellaneus*, Herbst, Krabben I. ii. 92 (*nec syn.*), pl. ii. fig. 18.

Philyra porcellana, Milne Edwards, Hist. Nat. Crust. II. 133: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 300, and Cat. Leucos. Brit. Mus. p. 14 (*nec syn.*)

Philyra polita, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 401, pl. xxxviii. figs. 1-3.

The whole exoskeleton (when not incrustated with *Hydrozoa*, &c., as it commonly is) has, to the naked eye, the appearance of glazed porcelain, although when examined with a lens it is minutely punctulate and granular.

The carapace is subcircular, the anterior portion being an arc of a smaller circle than the posterior; its dorsum is defined all round, behind the hardly at all pubescent front, by a line of fine beads all of equal size.

The epistome projects well beyond the edge of the front, which is deflexed, the deflexed portion being slightly acuminate downwards in the middle line.

None of the regions of the carapace are in any way defined.

The thoracic sterna and the base of the abdomen are bordered by granules, which are flattened and depressed.

The surface of the external maxillipeds is quite devoid of hair, though the edges of the exopodite have a fringe of exceedingly short hair, and the inner edge of the endopodite is, in the female, fringed with hair that is somewhat longer. The expanded exopodite is very broad anteriorly and has the inner edge quite straight (not curved).

The chelipeds in the adult male are a little more than twice the length, in the adult female about $1\frac{3}{4}$ times the length, of the carapace. The arms are covered with close-set flattened pearly granules on the upper surface except near the tip, on the whole of the inner surface, and on the basal half or third of the under surface. The wrist and hand are quite smooth, and only very occasionally in old males the inner surface of the hand is, under the lens, but not to the naked eye, roughened. The hand in both sexes is a little more than half again as long as broad, and is not inflated.

The fingers have much the same form in both sexes: they are almost in the same straight line with the hand; they meet closely only at tip, although they are faintly denticulate along the greater part of their extent; they do not, in the male, bear any enlarged dentiform tubercle; and the length of the dactylus is hardly greater than that of the outer border of the hand.

The true legs are not much longer than the male arm; their meropodites have every surface quite smooth, their propodites are bluntly carinate, and their dactyli lanceolate.

The abdomen of the male consists of two linear basal pieces and a triangular apical piece, and, between the two, a long narrow triangular plate which has no median denticle and is divided by a transverse groove of no great depth.

Colours in spirit: smoky bluish brown above, the blue deepest on the carapace.

The diameter of the carapace of the adult male does not exceed 20 millim., that of the adult female does not exceed 17 to 18 millim.

In the Indian Museum collection are 110 specimens, both young and adult, of both sexes, from the East coast, from the mouth of the Hooghly to Madras—and also from Karáchi.

Besides these there are 4 specimens (two males more than half-grown, a younger male, and one very young specimen) from Mergui. These have been compared by Dr. de Man with Fabricius' types of *P. globosa* from the Kiel Museum, and are stated by him to agree with Fabricius' female type.

They do not however, as Dr. de Man appears to suspect, agree with Fabricius' male type, and this involves a delicate question of synonymy.

From Dr. de Man's description it is evident that Fabricius' male is a species quite distinct from his female: as a matter of fact it appears to be the species named by Milne Edwards—and named probably with foresight—*P. globulosa*.

It seems therefore preferable to apply Milne Edwards name, *P. globulosa*, to Fabricius' male type, and to leave the name *P. globosa* in possession of Fabricius' female type.

The only other alternative is to make use of Dr. Henderson's name *P. polita* for Fabricius' female, and to let *P. globosa* stand for Fabricius' male. But this, I think, would be a little unjust to Dr. de Man, upon whose prior work the present attempt to clear up the confusion between the two species is based, and a little wanting in respect to the memory of the founder of modern carcinology.

73. *Philyra globulosa*, Edw.

?? *Cancer anatum*, Herbst, Krabben, I. ii. 93, pl. ii. fig. 19.

Philyra globulosa, Milne Edwards, Cuvier Règne An. Crust. pl. xxiv. fig. 4, and Hist. Nat. Crust. II. 132 (*nec syn.*): Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 300, and Cat. Lencos. Brit. Mus. p. 14 (*nec syn.*)

? *Philyra globosa*, Leach, Zool. Miscell. III. p. 22 (female only): ? Desmarest, Consid. Crust. p. 168 (part).

Philyra globosa, de Man, Journ. Linn. Soc., Zool., Vol. XXII. 1888, p. 203: only that part relating to Fabricius' male type, and not the part relating to Fabricius' female type and to the Mergui specimens.

? *Philyra heterograna*, Ortmann, Zool. Jahrbuch. Syst. etc. VI. 1892, p. 582, pl. xxvi. fig. 17, (half-grown male).

The whole exoskeleton (when not incrustated with *Hydrozoa* &c., as it rarely is) has the somewhat greasy look and feel of unglazed porcelain, except the legs and abdomen, which are polished.

The carapace is circular, its dorsum is defined all round, behind the hairy front, by a line of granules, some of which, at fairly regular intervals, are much enlarged and may even, in young specimens, form distinct denticles.

The epistome can be scarcely said to project beyond the front, since only the inner angles of the afferent branchial canals do so.

The edge of the front is emarginate in the middle line, so as to make the front, when denuded of hair, broadly bilobed.

An indentation of the margin of the carapace separates the hepatic from the branchial regions, and a broad groove separates the branchial regions from the cardiac and intestinal regions, on either side.

A band of granules visible to the naked eye is always found

on either pterygostomian region, bounding the buccal cavern; and almost always in females and young males, and often but by no means always in adult males, the hepatic regions and the outer and posterior parts of the epibranchial regions are distinctly granular to the naked eye.

The exposed parts of the thoracic sterna are more or less covered with granules, and there are granules on the base of the abdomen. But the greater part of the abdomen, in contrast with the sternum, is polished.

The edges of the maxillipeds are hairy in the same manner as, but much more coarsely than, those of *P. globosa* Fabr., and the surface also is in large part covered with hair: the foliaceous exopodite has an elegantly oval shape, owing to the fact that its inner edge is curved and enters the common curve of the outer and anterior edges without any abrupt transition.

The chelipeds in the adult male are a little more than twice the length, in the female only about $1\frac{1}{3}$ times the length, of the carapace. The arms bear numerous sharpish granules (speaking of those visible to the unaided eye alone) on the basal third (male) or basal half (female) of the upper surface, all along both the inner and outer borders of the upper surface, and on the basal third and inner border of the lower surface. The wrist has a row of granules along the upper border of its upper surface, and commonly also along the under border of the same surface; and the inner surface of the hand is defined above by a row of prominent granules, and below by several lines of smaller granules—all continued on to the base of the immobile finger, and all being very much less distinct in the female than in the male. The fingers are fluted, with the outer borders granular at base. The hand in the female is hardly longer, and in the male is only about one-fifth longer, than broad, and is considerably inflated. The fingers differ considerably according to sex, but both sexes agree in having the dactylus very markedly longer than the outer border of the hand, in the male they are bent inwards at an angle of about 145° with the hand, and the edge of the basal half of the dactylus is a good deal hollowed to make room for a strong dentiform tubercle on the opposed edge of the immobile finger; and it is only beyond this tubercle and its corresponding hollow that the fingers are denticulate: in the female the fingers are not bent inwards strongly, and their opposed edges are unbroken, and are denticulate in the greater part of their extent.

The true legs resemble those of *P. globosa*, except that (1) the under surface of the meropodites is granular—a line of granules on

the first pair, in the male only, being much enlarged, and (2) that the dactyli are distinctly palmulate.

The abdomen of the male consists of a single linear basal piece and a triangular apical piece, and, between the two, a long triangular plate which is divided in its distal fourth by a deep transverse groove, the piece so cut off bearing a median denticle in its distal half.

Colours in spirit: light yellowish-pinkish-brown to coppery, with a bluish tinge over a large part of the dorsum of the carapace.

The diameter of the carapace of the adult male is 29 to 30 millim., that of the adult female 22 to 24 millim.

In the Indian Museum collection there are 160 specimens collected all along the East coast, from the mouth of the Hooghly to Point Calimere, and on the coasts of Travancore, the Andamans, and the Persian Gulf.

74. *Philyra corallicola*, n. sp. Plate VII. fig. 1.

Carapace perfectly circular, convex: the hepatic regions form a pair of distinct dorsal swellings, and the branchial regions are separated from the median regions by deepish grooves: the summits of the hepatic regions, the posterior part of the gastric region, and the convexities of all the other regions are closely covered with vesiculous granules like those of *P. verrucosa*, but the grooves and hollows of the carapace are quite smooth. The front is divided longitudinally, from edge to base, into two tumid lobes by a deepish groove: its edge is straight and the tips of the mouth-parts can only just be seen beyond it in a dorsal view. The entire margin of the carapace is finely evenly and sharply crenulate. The sternum and convexities of the pterygostomian regions are finely granular, as are also the outer and distal parts of the external maxillipeds.

The external maxillipeds are shaped as in *P. globulosa*, Edw.

The chelipeds in the male are about $1\frac{1}{4}$ times the length of the carapace: the arm is closely covered, everywhere except on a distal patch of the inner surface, with vesiculous granules, which are largest on the upper surface: the wrist and hand are finely granular; there is a raised row of granules on the outer edge of the wrist, which becomes a granular crest on the outer edge of the hand; and there are two raised rows of granules along the inner surface of the hand: the fingers are about as long as the hand. The abdomen of the male consists of 3 pieces, the broad base of the long triangular second piece being granular: at the distal end of the second piece is a stout denticle.

Diameter of the carapace of an apparently adult male, 6 millim.

Loc. off Malabar Coast, 29 fms. on a bottom of "hard flat coral slabs" (Alfred Carpenter).

At first sight this species resembles *P. verrucosa*, Henderson, from which it is easily distinguished on close examination.

Pseudophilypira, Miers.

Pseudophilypira, Miers, P. Z. S., 1879, p. 40.

Of the small forms grouped together in the genus *Pseudophilypira* some present the greatest resemblance to the smaller species of *Leucosia*, and others to the smaller species of *Philypira*. All, however, may be distinguished from *Leucosia* by the absence of any trace of a "thoracic sinus"; and all may be distinguished from any Indian species of *Philypira* by the following characters:—(1) either the whole free edge of the front, or at least the tip of its median tooth, projects beyond the level of the epistome; (2) the buccal cavity is either longer than broad and shaped as in *Leucosia*, or only a very little broader than long; (3) the exognath of the external maxillipeds is never broadened, and never has the outer and anterior borders forming one unbroken sweep; (4) the front has always the form of a distinct snout, convex, and pinched off, at base, from the hepatic regions. Now in the only Indian species of *Philypira* in which this to some extent occurs, the side wall of either hepatic region forms an independent marginal facet to the carapace—a thing never seen in *Pseudophilypira*.

The whole exoskeleton porcellaneous.

Carapace subcircular or subpiriform, convex, with the regions usually not defined; produced in front to form a short upturned snout, similar in all its relations except length to that of *Leucosia*. The carapace is defined all round behind the front by a continuous raised and usually beaded line: its epimeral edge is not appreciably thickened, and is not approximated to the true lateral margin, so that there is no infolding of the lateral wall of the carapace or "thoracic sinus": nor is the epimeral edge of the carapace continuous with the line that defines the dorsum of the carapace posteriorly, as it is in *Leucosia*.

The buccal cavern is truncate-triangular: its length is usually greater than, but sometimes slightly less than its greatest breadth: the outer margin of the exognath meets the anterior margin abruptly, the exognath not being dilated.

The chelipeds are symmetrical and, relatively to the legs, very massive: in the male they are nearly twice the length of the carapace: a large part of the surface of the arms is ornamented with beadlike and vesicular granules: the hands are broad, but usually not so broad as long: the fingers are usually somewhere about the same length as the hand.

The abdomen of the male usually consists of 4 pieces, but the two

basal pieces are usually linear and hidden. The abdomen of the female consists of 3 or 4 pieces.

Key to the Indian species of Pseudophilyra.

- I. Front tridentate, the whole of its free edge projecting well beyond the epistome: carapace strongly convex: buccal cavern elongate, truncate-triangular, quite as in *Leucosia* :—
 1. Carapace closely and coarsely punctulate: hepatic regions defined: thoracic sterna of male normal *P. tridentata*.
 2. Carapace smooth and polished: third thoracic sternum of male with two processes or teeth,—one on either side of the abdomen :—
 - i. Hepatic regions defined: hands longer than broad: processes of third thoracic sternum stout, and projecting only on to the second sternum *P. pusilla*.
 - ii. Hepatic regions not defined: hands as broad as long: processes of third thoracic sternum laminar, and projecting well on to the first sternum ... *P. wood-masoni*.
- II. Front divided almost from the base by a deep longitudinal groove, its free edge straight and projecting just beyond the epistome: carapace strongly convex, with most of the regions well defined and tumid; the branchial, cardiac, post-gastric, and to a less extent the hepatic regions are, at any rate in the male, conspicuously granular in their tumid portion: buccal cavern a little broader than long *P. blanfordi*.
- III. Front with a single median tooth, the tip of which alone projects beyond the epistome: carapace moderately convex, with the hepatic regions defined: buccal cavern as long as broad *P. melita*.

75. *Pseudophilypira tridentata*, Miers.

Pseudophilypira tridentata, Miers, P. Z. S. 1879. pp. 20, 41, pl. ii. fig. 4.

Carapace subpiriform, its dorsum coarsely closely and uniformly punctulate everywhere except near the tip of the front, and defined all round behind the antero-lateral margins by a minutely-beaded line.

The front projects well beyond the margin of the buccal cavern and ends in three laminar teeth, the middle one of which is much the largest. The external orbital angles are acute, but do not reach the level of the frontal teeth. Posteriorly the frontal region extends straight backwards, between the hepatic regions, as a ridge, which is particularly conspicuous in the male. On either side of this ridge the hepatic regions are much depressed, but behind the depressions they form distinct mamillary elevations.

In the male the anterior and lateral margins of the sternum are indistinctly punctate, and the edges of the fossa in the first segment that lodges the tip of the abdomen are very finely beaded: in the female only the front border of the sternum is punctulate.

The chelipeds in the adult male are about $1\frac{2}{3}$ times the length of the carapace: the upper surface of the arm is irregularly granular in its basal half, punctulate in its distal half; the inner surface is covered with tiny vesicular granules in its basal half, the under surface is smooth: the wrist and hand are smooth, the hand about half as long again as broad: the fingers, which are as long as the hand is broad, meet only at tip and have the opposed edges almost smooth.

The first pair of true legs exceed the arms in length by almost the last two joints.

The male abdomen is narrow and triangular and consists of 4 pieces, but the two proximal pieces are linear and concealed: the long third piece has a median tooth near the distal end.

The carapace of the male measures 10 by 8 millim., that of the female 11.5 by 10 millim.

Colours in spirit: pinkish grey mottled with reddish and yellowish brown; spotted cross-bands of brown on arms and hands, and a cross-band of reddish brown on the fingers.

In the Indian Museum collection are two adult males and four adult females from the Persian Gulf.

76. *Pseudophilypira wood-masoni*, n. sp. Plate VI. fig. 3.

Carapace subpiriform, perfectly smooth and polished, its dorsum defined all round behind the hepatic regions by a faintly raised, smooth (microscopically granular) line.

The front projects beyond the margin of the buccal cavern and ends in three teeth of nearly equal size, but it is not prolonged backwards as a ridge between the hepatic regions. The external orbital angles are not acute.

The hepatic regions have no convexity distinct from the general convexity of the carapace.

In the male the third thoracic sternal segment is produced, on either side of the abdomen, to form a laminar tooth which projects forwards, across the second segment, well on to the first. And the margins of the fossa in which the tip of the abdomen is lodged are finely beaded.

The chelipeds in the adult male are twice the length of the carapace, and are exceptionally massive—the arm being between a half and a third as broad as long: the arm has its inner border and proximal half of upper surface beaded, its inner surface completely covered with vesicular granules, and its under surface smooth: the wrist and hand are quite smooth, the hand of the adult male being as broad as long: the fingers are stout, as long as the hand, and meet only at tip: the dactylus in the male has one of its teeth—situated near the middle—of very conspicuous size; the fingers in the female are without teeth.

The true legs exceed the arm in length almost by their last two joints.

The male abdomen resembles that of the last species, and its long second piece has a stout tooth at its extreme distal end.

The carapace of the male measures 7.5 by 6.5 millim., that of the female 8 by 7 millim.

Colours in spirit: uniform yellowish pinkish brown.

In the Indian Museum collection are 2 males (one adult) and 6 females (four ovigerous) from the Andamans, and an adult male from off Cape Comorin, 39 fathoms.

77. *Pseudophilypira pusilla*, Henderson.

Pseudophilypira pusilla, Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 398, pl. xxxvii. figs. 13–15.

Differs from *Pseudophilypira wood-masoni* in the following particulars only:—

1. Its size is even more diminutive, the carapace of the largest male in the Indian Museum—an undoubted adult—measuring 6 by 5 millim.

2. The edge of the front is straight, slightly deflexed and concave in the middle line, this deflexed portion being again produced horizon-

tally forwards as a median tooth. Posteriorly a faint carina runs straight backwards from the front, separating the hepatic regions, much as in *P. tridentata*.

3. The tooth on the third thoracic sternum, on either side of the abdomen, though more outstanding, is much shorter, projecting forwards only about halfway across the second sternum.

4. The chelipeds of the adult male are not more massive than usual, the arms being only about a quarter as broad as long, and the hands being more than half again as long as broad.

5. The fingers in the adult male, as in the female, are almost smooth, and there is no big tooth near the middle of the mobile finger.

6. There is but the faintest trace of a denticle on the male abdomen, in the middle line.

7. The colours are altogether different, even in a specimen that has been over 20 years in spirit in the same bottle with specimens of *P. wood-masoni*.

In good spirit specimens the dorsal surface is light grey with elegantly speckled markings of various shades of greenish and yellowish brown, as follows:—a band across the tip of the front: a V-shaped collar at base of front: a crescent on either branchial region, joining a stripe down the middle of the postgastric and cardiac regions, the whole looking like a scorpion with extended chelæ: a broad band across middle of arm and a narrow band across distal end of arm: a broad band across middle of hand, and a narrow stripe along both fingers. The ventral surface of the external maxillipeds and the tip of the abdomen closely speckled and mottled with dark brown.

Locality—Andamans, whence the Indian Museum collection has 3 adult males.

The foregoing three species have more the general facies of *Leucosia* than of *Philyra*.

78. *Pseudophilyra blanfordi*, n. sp. Plate VI. fig. 7.

Carapace circular, its dorsal surface defined all round behind the eyes by a finely beaded line; its regions are tumid and well demarcated, the tumid surfaces being very distinctly granular (excepting the front part of the gastric region) in the male, but in the female more punctate than granular. The front is distinctly pinched off at base from the hepatic regions, as in all the species of *Leucosia* except *L. truncata*, and as in all other species of *Pseudophilyra*: it is divided into two rather tumid lobes by a longitudinal groove that extends almost to its base: its anterior edge is straight, and projects just beyond the edge of the epistome.

In the male the whole surface of the sternum, except the segment belonging to the external maxillipeds, as also the pterygostomian region and extreme base of abdomen, is finely beaded, and the surface of the exognath is granular: in the female the outer border of the endognath also is granular, and the basal abdominal terga.

The exognath is not dilated in any part, and the buccal cavern is narrowed in front and is at least as long as broad.

The chelipeds in the male are less than twice, though more than $1\frac{1}{2}$ times, the length of the carapace; in the adult female they are not much longer than the carapace. The arms are cylindrical and are roughly granular everywhere except a very small part of the under and of the inner surface. The upper surfaces of the wrist and hand are slightly granular along the inner half. The hand is not greatly longer than broad. The fingers are as long as the hand, and are strongly bent inwards, much as in *Philyra globulosa*, Edw. On the immobile finger in the male there is a strong tooth, and on the opposed edge of the mobile finger a notch, beyond which the opposed edges are denticulate.

The abdomen of the male consists of 3 pieces, including a linear basal piece and a small apical piece: on the large middle piece the 6th tergum is marked by a shallow groove, and bears a stout median tooth at its distal border.

Diameter of carapace of male between 7 and 8 millim., of female the same.

Two males and four ovigerous females from the Mekrán Coast, 25 fathoms.

This little species bears a considerable resemblance to *Philyra adamsii*, Bell; but may be distinguished by its perfectly circular and strongly convex carapace, by its short chelipeds, and by the stout tooth on the abdomen of the male.

79. *Pseudophilyra melita*, de Man.

Pseudophilyra melita, de Man, Journ. Linn. Soc. Zool., Vol. XXII. 1888, p. 199: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 397.

Carapace in the adult almost circular, moderately convex; its dorsal surface defined all round, behind the front, by an elegantly beaded line; its surface, to the naked eye, smooth and polished.

The hepatic regions are defined by a slight dorsal acuminate bulge, or wrinkle.

The anterior margin of the front, which does not reach the level of the anterior margin of the buccal cavern, is concave and deflexed in the middle line, so as to appear somewhat bilobed, but the deflexed

concave portion is horizontally produced to form an acute tooth, the tip of which projects beyond the margin of the buccal cavern.

In the male the sternum is elegantly beaded along the anterior and lateral borders, and round the line of contact with the tip of the abdomen: in the female only the anterior border is beaded.

The chelipeds in the adult male are nearly twice the length of the carapace: the arms are cylindrical, and have the upper surface in its proximal half or two-thirds beaded in longitudinal lines; the under surface is granular, except at the distal end and along the outer border: wrist smooth: hand half again as long as broad in the adult male, about twice as long as broad in the female; its inner surface, in old males only, with numerous vesicular granules: fingers in both sexes as long as the hand is broad, meeting only at tips, and having the opposed edges distantly and inconspicuously dentate.

The first pair of true legs exceed the arm in length by their dactylus.

The abdomen of the male is narrowly triangular, and is devoid of any median denticle: it consists of 5 pieces, but the joint between the 3rd and 4th pieces is rigid.

The carapace of the male is 11 millim. long and 10 millim. broad; that of the female is slightly larger.

Colours in spirit: pearly grey with numerous darker mottled markings. The confluent gastric and cardiac regions are defined by a brown line, which forms with an ill defined ring of the same colour on either branchial region a pair of spectacles; the hepatic regions edged with brown: broad cross-bands of brown across middle of arm, base of hand, and middle of fingers; wrist brown: legs with yellowish brown cross-bands.

Common along Coromandel coast. Also from Mergui.

This species has more the facies of *Philyra* than of *Leucosia*.

Myrodes, Bell.

Myrodes, Bell, Trans. Linn. Soc. Vol. XXI. 1855 p. 298, and Cat. Leucos. Brit. Mus. p. 13.

Myrodes, Miers, 'Challenger' Brachyura, p. 297.

Closely resembles *Myra* in all details of form, but differs conspicuously in the following characters:—

(1) the chelipeds are much shorter, their length being hardly $1\frac{2}{3}$ times that of the carapace:

(2) the hands are not $\frac{1}{4}$ longer than broad and are inflated and subglobular:

(3) the fingers are much longer than the hand, are extremely slender and not much compressed, and are of about the same diameter

from their base to near their hook-like tip: the tip of the dactylus moves through an arc of over 120° .

(4) the merus of the external maxillipeds is hardly more than half the length of the ischium measured along its inner border.

80. *Myrodes eudactylus*, Bell.

Myrodes eudactylus, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 299, pl. xxxii. fig. 6, and Cat. Leucos. Brit. Mus. p. 13.

Myra eudactyla, A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 46, pl. iii. fig. 3: Haswell, Cat. Austral. Crust. p. 123.

Myrodes gigas, Haswell, P. L. S., N. S. Wales, Vol. IV. 1880, p. 52, pl. v. fig. 5.

Myrodes eudactylus, Miers, 'Challenger' Brachyura p. 298: A. Ortmann, Zool. Jahrbuch., Syst. etc., VI. 1892, p. 576.

Carapace convex, longitudinally-ovoidal, with a carina—indistinct or obsolete in large adults—down the middle line; its surface generally smooth to the naked eye in large adults, but with numerous scattered bead-like granules in the young; its short posterior margin with a petaloid tooth at either end, and overhung in the middle line by a horizontal recurved spine; its lateral margins defined by a finely-beaded line.

The front is truncated and broadly bidentate, and the subhepatic region forms an independent facet, the raised pterygostomial edge of which ends posteriorly at a sharp tooth. Between the hepatic and branchial regions, on either side, is a shallow notch which is in continuity with a longitudinal groove in the side wall of the carapace.

The external maxillipeds are closely scabrous, especially distally.

The chelipeds are hardly $1\frac{2}{3}$ times the length of the carapace (without spine), and though generally smooth to the naked eye in the adult, have, in the young, the base of the arm, the outer edge of the wrist, hand and dactylus, and the inner two-thirds of the upper surface of the hand finely but distinctly granular: the arm is subtrigonal, and the hand subglobular but much smaller at the distal end than at the base: the fingers are slender and hook-like, much longer than the hand, finely granular, of almost the same diameter from the base to the hook-like tip, and are armed on the opposed edges with fine teeth with larger lancet-like teeth at distant intervals: the movable finger opens in a horizontal plane, but it moves through an arc of between 120° and 130° .

The legs are slender, and have both edges of the dactylus, and the dorsad edge of the propodite, fringed with close shortish stiffish hairs.

The abdomen of the male is four-jointed, the penultimate piece carrying a subterminal denticle: that of the female consists of 5 separate pieces.

Numerous specimens—adults and young of both sexes—from the Andamans.

Iphiculus, Adams and White.

Iphiculus, Adams and White, 'Samarang' Crustacea p. 57.

The whole body and its appendages, except only the fingers, covered with a dense spongy or woolly tomentum, beneath which, when denuded, the surface is rough granulous or pustulous, and beneath which the regions of the carapace—especially the cardiac and intestinal—are demarcated by grooves.

Carapace transversely somewhat oval, its lateral margins spinate.

The front is narrow and is sunk behind the level of the edge of the buccal cavern, and appears still more sunken because the hepatic and sub-hepatic regions are puffed out beyond it at the sides and in front.

The orbits are obliquely elongate and completely conceal the eyes, in the denuded carapace three sutures can be made out in the emarginate roof. There is a gap at the inner canthus in which stands the basal joint of the antenna, the largish flagellum of which appears to be inside the orbit. The antennules fold very obliquely. There is a broad vertical space between the lower edge of the orbit and the edge of the buccal cavern.

The buccal cavern is triangular: the merus of the external maxillipeds is half the length of the ischium measured along the inner border.

The chelipeds are about $1\frac{2}{3}$ the length of the carapace: the hand is short and globular: the fingers are slender and hook-like, much longer than the hand, and open in a somewhat oblique plane, the tip of the mobile finger moving easily through an arc of 120° . Legs rather large.

Abdomen of male with the 3rd and 4th segments fused: that of the female with all the segments distinct.

81. *Iphiculus spongiosus*, Adams and White.

Iphiculus spongiosus, Adams and White, 'Samarang' Crustacea, p. 57, pl. xiii. fig. 5: Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 161: Miers, Zool. H. M. S. 'Alert' pp. 185, 253.

Carapace convex, transversely ovoidal, much broader than long, the surface when denuded of its woolly covering granulous with numerous larger pustulous tubercles, and showing the cardiac and intestinal regions tumid and very well demarcated by grooves. On the antero-lateral margins are four large coarse close spines, increasing in size from before backwards; on the postero-lateral margins are two coarse denticiform tubercles separated by a wide interval.

The broad front is coarsely bilobed : there is a strong tooth at the outer angle of the orbit against which the retracted eye impinges, and another at the outer angle of the buccal cavern, on either side—only visible on the denuded carapace.

Except that they are densely tomentose up to the base of the fingers, and that the fingers are even more slender, the chelipeds are a repetition of those of *Myrodes*.

In the Indian Museum are numerous specimens, from the Andamans, the Mekrán Coast, and from the Bay of Bengal up to 65 fms.

Pariphiculus, n. gen.

Closely allied to *Iphiculus*, but differing in several important characters and in the whole form of the carapace. The appendages are as densely tomentose as in *Iphiculus*, but the carapace is covered with a finer and sparser tomentum which does not quite conceal the texture of the surface.

The carapace is circular and globular, with its margins coarsely spinate, and its surface vesiculous : the intestinal region is very distinctly isolated, but the other regions are almost lost in the general convexity of the carapace.

The front is narrow : in one species it projects as a distinct snout, in the other the angle of the afferent branchial canal can be seen beyond it in a dorsal view, but the whole mouth can never be seen beyond it as it can in *Iphiculus*.

The orbits are obliquely elongate and completely conceal the eyes : two distinct fissures are plainly visible in the emarginate roof besides a fissure in the lower part, and there is a gap at the inner canthus where the basal joint of the antenna—the flagellum of which is large—stands. The antennules fold very obliquely. There is a space of varying width between the edge of the orbit and the edge of the buccal cavern.

The buccal cavern is rather elongate triangular, and the merus of the external maxillipeds is half the length of the ischium measured along the inner border.

The chelipeds are from $1\frac{1}{4}$ to $1\frac{2}{3}$ times the length of the carapace : the hand is short, cylindrical with the base inflated, or is subglobular, but not nearly so swollen as in *Iphiculus* or *Myrodes* : the fingers are slender, much longer than the hand and somewhat hooked ; they open in an obliquely vertical plane, and the tip of the mobile finger moves through the usual arc of about 75° . The legs are moderately stout. The abdomen of the male has the 3rd, 4th and 5th segments fused : that of the female has all the segments distinct.

Key to the Indian species of Pariphiculus.

- I. Carapace a little broader than long: front not at all prominent: a spiniform tubercle on the cardiac region between one on either branchial region: chelipeds about $1\frac{2}{3}$ the length of the carapace *P. coronatus*.
- II. Carapace longer than broad: front markedly prominent: cardiac region and branchial regions immediately on either side of it unarmed: chelipeds about $1\frac{1}{4}$ the length of the carapace *P. rostratus*.

82. *Pariphiculus coronatus*, Alcock & Anderson.

Randallia coronata, Alcock & Anderson, J. A. S. B., Vol. LXIII. pt. 2, 1894, p. 177.

Pariphiculus coronatus, Alcock & Anderson, Ill. Zool. 'Investigator,' Crust. pl. xxiv. fig. 2 (in the press).

Carapace globular, just broader than long, its surface closely covered with large vesiculous granules beneath a dense fine-textured pubescence: the intestinal region forms an independent circular swelling, bounded by a deepish groove, and surmounted by two spiniform tubercles, one behind the other: the gastric region is partly defined anteriorly by two creases, and the cardiac region is partly defined posteriorly by two grooves, and a narrow and indistinct groove separates the hepatic from the branchial region on either side: on either lateral margin are 5 spiniform tubercles, not including the dentiform prolongation of the outer angle of the buccal cavern, and at either end of the short posterior margin is a dentiform tubercle: 3 similar tubercles occur, one in the middle of the cardiac region and one on either side of it on the after part of the branchial regions—these three, along with the last on the lateral borders and the two on the posterior margin, forming a ring round the tumid intestinal region: the side-wall of the carapace is grooved longitudinally just above the epimeral edge.

The front is bidentate, its tips just projecting beyond the level of the buccal cavern.

The chelipeds in the female (male unknown) are $1\frac{2}{3}$ times the length of the carapace: the hand is inflated, cylindrical, and about $\frac{3}{4}$ the length of the fingers: the fingers are very slender, almost hairless, hooked at tip, finely denticulate with a few slightly larger denticles at distant intervals, and they open in an obliquely vertical plane.

Length of carapace of female (apparently adult) 16 millim., breadth 17 millim.

Loc. Bay of Bengal, off Coromandel coast, 112 fms.

83. *Pariphiculus rostratus*, n. sp. Plate VIII. fig. 2.

Carapace globular, a little longer than broad, with the front prominent and projecting in the form of a snout; its surface covered with very small, distant vesicles, beneath a dense fine pubescence: the intestinal region exactly resembles that of *P. coronatus*, and the gastric and cardiac regions are incompletely defined in the same way: on either lateral border are six sharpish tubercles, the first of which—situated about the middle of the pterygostomian ridge—and the third—situated near the anterior limit of the branchial region—are enlarged and spiniform: at either end of the short posterior margin is a dentiform tubercle: the side-wall of the carapace is traversed longitudinally by two grooves, one just above the epimeral edge, the other just below the lateral margin, and the surface between the grooves is tumid.

The very prominent front is sharply bidentate, the tips of the teeth being somewhat sharpened and thickened: the space between the edge of the orbit and the edge of the buccal cavern is much reduced.

The chelipeds are similar in both sexes and are about $1\frac{1}{4}$ times the length of the carapace, sometimes less than this: the hand is subglobular but not so swollen as in *Iphiculus* and is only about half the length of the fingers: the fingers are slender, hooked at tip, and finely denticulate, the denticulations, however, being obscured by a thick growth of short colourless hairs; they open in an obliquely vertical plane.

The largest specimen—an apparently adult female—has the carapace 32 millim. long and 27 millim. broad.

Loc. Off Malabar coast 28 to 45 fms., off Coromandel coast 25 to 30 fms., on soft muddy bottoms.

Nursilia, Bell.

Nursilia, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 308, and Cat. Leucos. Brit. Mus. p. 20.

Carapace broader than long, bluntly polygonal, with the lateral borders sharp, thin, laminar, somewhat turned up, and with the surface broken by some definitely-placed ridges and distant spines. Front prominent, bidentate: orbits with two distinct sutures, their lower edge not distinct from the edge of the buccal cavern. Antennæ with longish flagella, their basal joint occupying the very much restricted space between the eye and the obliquely folding antennules.

Buccal cavern elongate-oval, the hairy tips of the external maxillipeds projecting beyond the edge of the buccal cavern: the merus much hidden in hair (more so than in *Ixa*) and considerably less than half the length of the ischium.

Chelipeds somewhat slender, about half again as long as the carapace: hands swollen, especially towards the inner side and the base: fingers much longer than the hand, slender, hook-like; the tip of the dactylus moves through an arc of more than 130° .

In the abdomen of both sexes all but the first and last segments are intimately fused.

As the name indicates, this form has the carapace and front shaped very much as in *Nursia*, though approaching *Ilia*—or rather *Myrodes*—in the form of the chelipeds and mouth-parts.

84. *Nursilia dentata*, Bell.

Nursilia dentata, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 309, pl. xxxiv. fig. 6, and Cat. Leucos, Brit. Mus. p. 20: Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 161: Haswell, P. L. S., N. S. Wales, IV. 1879, pp. 56, 404, and Cat. Austral. Crust. p. 128: Miers, Zool. H. M. S. 'Alert,' pp. 158, 253, 518, 548: R. I. Pocock, Ann. Mag. Nat. Hist. (6) V. 1890, p. 73.

Carapace broader than long, distinctly polygonal in the male, but with the angles more rounded off in the female. The lateral margins are thin, sharp, slightly turned up, and sinuous (laciniate in the young): the ends of the short posterior margin are dentiform in the male, but indistinctly so in the female.

The carapace is traversed by a longitudinal carina, on the posterior half of which are 3 large vertical spines with the tips often curved forwards: an oblique ridge ending in a sharpish tooth separates the gastric from the hepatic region on either side: another oblique ridge, with a sharpish tooth at each end, runs across the after part of the branchial region to the postero-lateral margin on either side: there are always one or two teeth on either side of the longitudinal carina in the gastro-cardiac region. In the young the oblique gastro-hepatic ridge is connected by a longitudinal ridge with the oblique branchial ridge, the branchial ridges more or less meet across the carapace, and the spines are more numerous and more distinct.

The chelipeds have the arm very sharply trigonal: the fingers are slender and hook-like and are twice the length of the much swollen hand: they are finely denticulate with enlarged teeth at distant intervals, and as in *Myrodes*, the dactylus is remarkable for the great range of its mobility.

Adult females have the carapace about 9 millim. long and about 10.5 millim. broad: adult males are a good deal smaller.

A large number of specimens are in the Indian Museum Collection, from the Andamans, from off Ceylon at 32 to 34 fms., from the Madras coast in the neighbourhood of Palk Straits, from off the Malabar coast at 26 to 31 fms., and from off the Maldives at 20 to 30 fms.

85. *Nursilia tonsor*; n. sp.

This species is distinguished (1) by its smaller size,—ovigerous females having the carapace only 7 millim. long and 7.25 millim. broad, and adult males being a good deal smaller: (2) the gastro-cardiac region is defined posteriorly on either side by an oblique dentigerous ridge, which meets the oblique ridge that traverses either branchial region at an obtuse angle—the whole forming a sharply defined W reversed: (3) the hand is less swollen and the outer edge of the fingers is cristiform—the cristiform lamina being of extreme thinness and delicacy: (4) the serrations of the lateral margins and the ridges and spines of the carapace are all much sharper-cut.

Loc. Andaman Sea up to 40 fms., off Ceylon 34 fms.

Heterolithadia, Wood-Mason, (name only).

Carapace broader than long, transversely somewhat oval, its surface nodular, coarsely granular, convex except the hepatic regions which are hollowed; all the regions well delimited by grooves.

Front distinct, moderately prominent, broadly bidentate. Orbits with very indistinct sutures in the outer wall, and with very little space between their lower edge and the edge of the buccal cavern. The antennules fold obliquely. The antennæ have a short flagellum and occupy the much restricted space between the antennules and the eye.

Buccal cavern triangular with the sides curved somewhat as in *Nursilia*: merus of external maxillipeds half the length of the ischium measured along the inner border.

Chelipeds stout, about half again as long as the carapace: hand very short, swollen, half the length of the fingers: fingers slender, of nearly the same diameter from base to near the hook-like tip, opening in a nearly vertical plane, the tip of the dactylus being movable through an arc of about 75°.

The abdomen of the male has the 3rd–6th segments fused.

Heterolithadia has a strong external resemblance to *Lithadia*, but has the *Ilia* fingers and external maxillipeds. Its nearest ally is *Nursilia*.

86. *Heterolithadia fallax*, (Henderson).

Ebalia fallax, J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 402, pl. xxxviii. figs. 4–6.

The posterior half of the carapace is a segment of a broad ellipse, the anterior half is broadly triangular.

The carapace is broader than long, and its surface, like the whole under surface of the body and the whole surface of the arms, is closely covered with large flat-topped pearly granules, except in the deeply-excavated hepatic areas where the granules are small and rather distant.

The regions are well demarcated by grooves, and (except the hepatic regions, which are markedly excavated inside of the rather prominent antero-lateral borders) are tumid. A broadish median ridge extends from the front to near the middle of the cardiac region, where it ends in a stout tubercle, and in continuation of the same line, on the intestinal region, are two similar tubercles: there are also four similar tubercles on the gastric region,—two on either side of the median ridge.

The front is broadly bidentate: behind it the pterygostomial ridge, which ends at a coarse denticle, can be seen in front of the antero-lateral margin in a dorsal view: the hepatic portion of the antero-lateral margin is thickened and ends abruptly at a very prominent granular swelling; behind this the lateral margin is most elegantly curved. The posterior margin is rather prominent and is bilobed, the apex of one of the intestinal tubercles being seen between the lobes in a dorsal view.

The chelipeds are rather more than half again as long as the carapace: the arm is coarsely granular like the carapace, the wrist and hand are granular under the lens: the hand has the outer edge somewhat thickened and raised and the inner side swollen: the fingers are hooked, are twice the length of the hand, and open in a nearly vertical plane; their opposed edges are finely denticulate with larger denticles at distant intervals and with a good many hairs.

The abdomen of the male has a tooth at the penultimate segment.

In the Indian Museum is a specimen from the Audamans and one from the Orissa Coast.

Arcania, Leach.

Arcania and *Iphis*, Leach, Zool. Miscell. III. p. 19.

Arcania and *Iphis*, Milne Edwards, Hist. Nat. Crust. II. 133, 138.

Arcania and *Iphis*, Bell, Trans. Linn. Soc., Vol. XXI. 1859, pp. 309, 311, 312.

Arcania, A. Milne Edwards, Nouv. Archiv. du Mus. X. 1874, p. 48.

Arcania, Miers, 'Challenger' Brachyura, p. 299.

Carapace globular, ovoid, or rhomboidal, with the lateral and posterior margins armed with definitely-situated large spines (except in *Arcania gracilipes* Bell, in which large tubercles take the place of spines, and *A. orientalis* Miers, in which spines are absent), and with

the surface, usually, crisply granular, spiny, or tubercular, but sometimes almost smooth to the naked eye.

Front bilobed and prominent, or if not prominent then distinctly pinched off from the gastric and hepatic regions.

Orbits with three sutures in the upper and outer wall, with a cleft in the inner wall, and usually with the inner canthus prolonged into a spine: eyes small.

The antennules fold very obliquely. The antennæ are small, and their basal joint loosely fills the cleft in the inner wall of the orbit.

The buccal cavern is elongate-triangular: the external maxillipeds have the ischium from $2\frac{1}{2}$ to 3 times the length of the bluntly-triangular merus: their exognath is narrow, with the outer border nearly straight.

The chelipeds are very slender and are usually about twice the length of the carapace—either a little more or a little less; their joints are cylindrical, the palm alone being a little swollen at base: the fingers are long and very slender, their opposed edges being finely ctenoid, with larger denticles at long intervals; they open in a nearly vertical plane.

The legs are slender.

The abdomen of the male usually consists of 5 pieces, that of the female of 4 or 5.

Key to the Indian species of Arcania.

- I. Margins of the carapace with spines, hepatic regions dorsally convex: abdomen of adult male consisting of 5 pieces:—

1. Fingers longer than the hand: surface of carapace either smooth (microscopically granular), or with small granules all of one size:—

- i. Lateral median epibranchial spines nearly straight, far longer than any of the other spines, their length often being equal to the breadth of the carapace:—

- a. Seven spines on margins of carapace,—3 very large, 4 smaller.....

A. septemspinosa,
(Fabr.)

- b. Five spines on margins of carapace,—3 very large, 2 smaller

A. quinquespino.

- ii. Median lateral epibranchial spines claw-like, not longer than the spines on the posterior part of the carapace, their length being not a quarter the breadth of the carapace:—
 - a. Nine spines on margins of carapace,—3 large and 6 smaller: regions of carapace very ill-defined *A. novemspinosa.*
 - b. Eleven spines on margins of carapace,—none of them very large: regions of carapace well defined *A. undecimspinosa.*
 - 2. Fingers shorter than the hand: surface of carapace covered with spines, or with granules and larger tubercles:—
 - i. Carapace longer than broad: chelipeds less than twice the length of the carapace:—
 - a. Carapace densely spiny: eleven large marginal spines *A. erinaceus.*
 - b. Carapace with granules and claviform tubercles: eleven marginal prominences, of which only 4 or 5 can be called spines *A. tuberculata.*
 - ii. Carapace broader than long: chelipeds a little over twice the length of the carapace: carapace with granules and large tubercles *A. pulcherrima.*
 (= *A. septemspinosa*, Bell.)
- II. Margins of carapace with large tubercles in place of spines, hepatic regions dorsally sunken and flat: abdomen of adult male consisting of 4 pieces, and the second piece sunk almost out of sight *A. gracilipes.*

87. *Arcania septemspinosa*, (Fabr.), Leach, Edw.

Cancer septemspinus, Fabr., Mant. Ins., I. 325, and Ent. Syst., II. 463 : Herbst, Krabben, I. ii. 259, pl. xx. fig. 112.

Leucosia septemspinosa, Fabr., Ent. Syst. Suppl., p. 351 : Bosc, Hist. Nat. Crust. I. 237 : Latreille, Hist. Nat. Crust. et Ins. VI. 119.

Iphis septemspinosa, Leach, Zool. Miscell. III. p. 25 : Desmarest, Consid. Gen. Crust., p. 170 : Milne Edwards in Cuvier Règne Animal, Crust., pl. xxv. fig. 4, and Hist. Nat. Crust. II. 139 : Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 311, and Cat. Leucos. Brit. Mus. p. 22 : Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 161 : Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 317 : Sluiter, Tijdschr. Nederl. Ind. XL. 1881, p. 159, fig. 1.

Arcania septemspinosa, Miers, 'Challenger' Brachyura, p. 300 : Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 403.

Carapace bluntly rhomboidal, the anterior blunt angle of the rhomb forming the elegantly bilobular, slightly projecting, front, and the lateral and posterior angles being all produced to form huge slightly-curved spines—the lateral ones being the longest. Besides these, there are four other smaller spines in the posterior part of the carapace, namely one on either side at the level of, and one on either side below, the large posterior spine. The surface of the carapace is finely granular in irregular patches, the granules being most distinct on the large spines. The hepatic regions are separated from the branchial regions on either side by a transverse crease or pucker, but otherwise the regions of the carapace are not clearly demarcated. The summit of the (antero-lateral) convexity of the hepatic region is, usually, faintly acuminate. The chelipeds are symmetrical and slender, and are more than twice the length of the carapace (posterior spine excluded) in both sexes: the long cylindrical arms are very finely and uniformly granular: the almost filiform fingers are a little longer than the slender tapering hand. The true legs are slender and smooth, and the dactyli are thickly fringed with rather long hair: the first pair exceed the arm in length by their dactylus and rather more than half their propodite.

Colours streaky and patchy red.

The carapace of an average adult of either sex is about 20 millim. long, and about 20 millim. broad.

Localities: Andamans, Arakan, Gangetic and Máhánaddi Deltas, Madras coast, Persian Gulf. It is commonest on muddy bottoms at about 25 fathoms.

Of 92 specimens in the Indian Museum the lateral spines are found to vary a good deal in length: they are usually, in adults, about as long as the arm, and sometimes a good deal longer; but in the young they are usually much shorter than the arm.

88. *Arcania quinquespinosa*, Wood-Mason MS. name,
Alcock and Anderson.

Arcania quinquespinosa, Alcock and Anderson, J. A. S. B., Vol. LXIII. pt. 2, 1894, p. 206, and Ill. Zool. B. I. M. S. "Investigator," Crust., pl. xxiv. fig. 6 (*in the press*).

? *Arcania septemspinosa*, var. *gracilis*, Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, pp. 403, 404.

Differs from *A. septemspinosa* (Fabr.) only in the following particulars:—

1. It is a much smaller species, the carapace of the adult being less than 12 millim. long, and less than 14 millim. broad.
2. The outline of the carapace is broadly conical, owing to the bulging, obliquely backwards, of the branchial regions.
3. The front is sharply bidentate, instead of bilobular.
4. The large spines of the margins of the carapace are relatively smaller, and the spine on the postero-lateral border, on either side, is either altogether wanting or is represented only by a granule.
5. The regions of the carapace, with the single exception of the boundary between the gastric and cardiac regions, are distinctly delimited by fine grooves.
6. The fingers are nearly twice the length of the hand.
7. The cardiac region in life, and even in fresh spirit specimens, shows as a large bright red milk-white-edged ocellus. The rest of the carapace is delicate pink in life.

In the Indian Museum collection are 27 specimens—chiefly adult males and egg-laden females—from the coasts of Arakan, Ganjam, Vizagapatam, Ceylon, and the Persian Gulf.

89. *Arcania undecimspinosa*, De Haan.

Arcania undecimspinosa, De Haan, Faun. Japon. Crust., p. 135, pl. xxxiii. fig. 8: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 309, and Cat. Leucos. Brit. Mus. p. 21: Miers, Zool. H. M. S. 'Alert' pp. 518, 548: (?) A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1890, p. 111: Ortmann, Zool. Jahrbüch., Syst. etc., VI. 1892, p. 577: J. R. Henderson, Trans. Linn. Soc., Zool. (2) V. 1893, p. 404.

Arcania granulosa, Miers, Trans. Linn. Soc., Zool., (2) I. 1875-79, p. 240, pl. xxxviii. fig. 29 (*vide* Miers, P. Z. S. 1879, p. 44): Haswell, P. L. S., N. S. Wales, IV. 1879, p. 58, and Cat. Austral. Crust. p. 131.

?? *Arcania novemspinosa* var. *aspera*, Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 317.

Carapace longitudinally ovoid in the male, nearly globular in the adult female, uniformly covered either with rather distant miliary granules or with close-set short prickles, amid which the fine smooth grooves that define the regions of the carapace are very distinct,—the

only one wanting being that between the gastric and cardiac regions. The margins of the carapace are armed with eleven spines of moderate size, situated as follows:—one, pointing obliquely forwards, in either antero-lateral border, at the culmination of the sub-hepatic region; one on either side just behind the groove that separates the hepatic from the branchial region; one, claw-like, at either (median) lateral epibranchial angle; one, pointing obliquely backwards, just abaft the middle of either postero-lateral border; one at either end of the posterior border; and one, pointing straight backwards, in the middle of the intestinal region. The front ends in two sharp-cut laminar teeth.

The slender chelipeds, in the adult male, are just over twice the length of the carapace (spine excluded); the arm is usually, but not always, covered in all or the greater part of its extent with miliary granules similar to those on the carapace; the almost filiform fingers are as long as the hand and rather more than half the wrist combined. The true legs are slender and smooth; their dactyli are scantily fringed with hair in their distal half: the first pair exceed the arm in length by their last two joints.

The length of the carapace of the adult male is about 16 millim., and the breadth about 14 millim.; of an adult female the dimensions are 18 millim. by 16 millim.

In the Indian Museum collection are young and adults of both sexes, from the Andamans and from the Madras side of Palk Straits.

90. *Arcania novemspinosa*, Adams & White.

Iphis novemspinosa, Adams & White, 'Samarang' Crust. p. 56, pl. xiii. fig. 1.

Arcania novemspinosa, Bell, Trans. Linn. Soc., Vol. XXI. 1855, p. 309, and Cat. Leucos. Brit. Mus. p. 21: Haswell, P. L. S., N. S. Wales, IV. 1879, p. 58, and Cat. Austral. Crust. p. 131: de Man, Archiv für Naturges. LIII. 1887, i. 392.

Differs from *A. undecimspinosa*, De Haan, only in the following characters:—

1. The surface of the carapace, in the adult, is almost smooth—at any rate is without isolated miliary granules or prickles.

2. The marginal spines are very much larger, with the single exception of the spine on either side situated at the junction of the sub-hepatic and branchial regions, which is a mere denticle or granule.

3. With the exception of a faint groove between the hepatic and branchial regions, and of a still more indistinct break of level between the branchial and intestinal regions on either side, the regions of the carapace are not defined.

4. The front is more prominent.

5. The chelipeds in the adult male are $2\frac{1}{2}$ times the length of the carapace, and the arm is only very finely granular; and at the base only.

6. The carapace in the adult male is a little more elongate.

Two adult males and a half-grown female from the Andamans are in the Indian Museum collection.

The differences above noted are plain enough in extreme forms, but their sum is not constant, as it is in the case of the differences between *A. 7-spinosa* and *A. 5-spinosa*, so that it seems doubtful whether *A. 9-spinosa* is really distinct from *A. 11-spinosa*.

91. *Arcania erinaceus*, (Fabr.)

Cancer erinaceus, Fabricius, Mantiss. Insect. I. 325, and Ent. Syst. II. 460: Herbst, Krabben, I. ii. 258, pl. xx. fig. 111.

Leucosia erinaceus, Fabr., Ent. Syst. Suppl. p. 352: Latr., Hist. Nat. Crust. et Ins. VI. 119.

Arcania erinaceus, Leach. Zool. Miscell. III. p. 24: Desmarest, Consid. Gen. Crust., p. 170, pl. xxviii. fig. 1: Milne Edwards in Cuvier Règne An., Crust., pl. xxiv. fig. 2, and Hist. Nat. Crust. II. 134: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 309, and Cat. Leucos. Brit. Mus. p. 20.

Carapace globular, everywhere thickly covered with thorns and spine-like granules, amid which the smooth shallow sulci that define the branchial and hepatic regions are visible. Round the margin of the carapace are eleven large spines, similar in position to but larger in size than those of *A. undecimspinosa*, and covered with secondary spinelets. The ventral surface of the external maxillipeds, the thoracic sterna, and the abdominal terga are all also sharply granular. The front ends in two prominent sharp teeth.

The chelipeds and the true legs have their meropodites covered with thorns, and the other joints—except the dactyli, the distal half of the hand, and the fingers—sharply granular. The chelipeds, even in the adult male, are only about $1\frac{2}{3}$ times the length of the carapace (spine excluded), and the fingers are a little shorter than the palm. The first pair of true legs exceed the arms in length by their last $2\frac{1}{2}$ joints.

The carapace of the adult male is 16 millim. long and 14 millim. broad; that of the adult female is 21 millim. long and 19 millim. broad.

Loc. East coast, from the Hooghly to Pondicherry. In the Indian Museum collection are an adult male and a young and three adult females.

92. *Arcania tuberculata*, Bell.

Arcania tuberculata, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 310, pl. xxxiv. fig. 8, and Cat. Leucos. Brit. Mus. p. 21.

? *Arcania lævimana*, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 310, pl. xxxiv.

fig. 10, and Cat. Leucos. Brit. Mus. p. 22: A. Milne Edwards, Nouv. Archiv. X. 1874, p. 48, pl. iii. fig. 4.

Carapace subglobular with an abruptly prominent bidentate front; closely covered everywhere, except in the anterior half of the front, with elongate granules some of which are large and claviform. The regions of the carapace are fairly well defined. In the position of the marginal spines of *A. undecimspinosa* there are 11 marginal prominences, of which only 4 or 5 in the posterior part of the carapace deserve the name of spines, the others being denticles not vastly larger than the enlarged claviform tubercles of the dorsal surface. These spines and denticles are covered with secondary granules in all or part of their extent.

The chelipeds, even in the adult male, are not $1\frac{2}{3}$ times the length of the carapace: the arms are elegantly granular; the wrists have a few granules and, on their outer surface, a tooth; the hands are nearly smooth: the fingers are little shorter than the hand.

The legs are slender and perfectly smooth.

The carapace of the adult male is 8 millim. long and 6 millim. broad, that of the adult female is 10 millim. long and 9 millim. broad.

Loc. Andamans and Maldives. In the Indian Museum collection are 11 specimens—young and adults of both sexes, including ovigerous females.

93. *Arcania pulcherrima*, Haswell.

Arcania septemspinosa, Bell *nec* Fabricius, Bell, Trans. Linn. Soc., Vol. XXI. 1855, p. 310, pl. xxxiv. fig. 7, and Cat. Leucos. Brit. Mus. p. 21.

Arcania pulcherrima, Haswell, P. L. S., N. S. Wales, IV. 1879, p. 58, and Cat. Austral. Crust. p. 131: Miers, Zool. H. M. S. 'Alert' p. 253 (*ubi synonym.*), and 'Challenger' Brachyura, p. 299 (footnote).

Carapace transversely ovoid, the front not breaking beyond the general outline: its surface everywhere covered with miliary granules, amid which stand out 13 or 14 granule-covered tubercles arranged in five incomplete longitudinal rows. Round the margin of the carapace are 10 granule-covered prominences, the first two of which on either side are mere denticles, while the remaining six are broad spines,—those at the lateral epibranchial angle on either side being much the longest. The regions of the carapace are ill defined. The inner canthus of the orbit is not prolonged into a spine as it is in all the preceding species.

The chelipeds are slender even for the genus, and in the adult male are just over twice the length of the carapace: the arm alone is elegantly granular: the fingers are a little shorter than the hand. The true legs are slender and perfectly smooth.

The carapace of the adult male is about 9 millim. long and 10 broad; that of the adult female is about 10 millim. long and 12 broad.

In the Indian Museum collection are 3 adult males and 2 adult females (one egg-laden) from off Ceylon, 34 fms.

94. *Arcania gracilipes*, Bell.

Arcania gracilipes, Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 310, and Cat. Leucos. Brit. Mus. p. 22: (Haswell. P. L. S., N. S. Wales, Vol. IV. 1879, p. 58?)

Carapace globular, just as broad as long, with the hepatic regions dorsally sunken and flat, so as to throw the front—which does not otherwise project much—into strong relief. The circumference, like the dorsum of the carapace, is armed not with spines, but with numerous large tubercles, which, like the general surface between them, are closely covered with flat discoidal granules: there are altogether about 24 of these large tubercles. The regions of the carapace are fairly well defined. The front ends in two blunt teeth: the inner canthus of the orbit is not prolonged into a spine.

The chelipeds, in the adult male, are slightly over twice the length of the carapace: the arm wrist and hand are elegantly granular like the carapace, the granulation in the case of the wrist and hand being microscopic: the fingers are just equal in length to the hand. The true legs are slender, and are microscopically granular like the hand: the first pair exceed the arm by less than the length of their dactylus.

The abdomen of the male consists of only four pieces, but the second piece is hidden almost out of sight. The carapace of the adult male is 7 millim. long and broad, that of the female 10 millim.

An adult male and 5 females—three ovigerous—from the Andamans.

Ixa, Leach.

Ixa, Leach, Trans. Linn. Soc. Vol. XI. 1815, p. 334.

Ixa, Milne Edwards, Hist. Nat. Crust. II. 134.

Ixa Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 311, and Cat. Leucos. Brit. Mus. p. 23.

Ixa, Miers, 'Challenger' Brachyura, p. 1300.

Carapace broadly rhomboidal, produced on either side, at the junction of the antero-lateral and postero-lateral borders, into a great sausage-shaped spine of enormous size often with an abruptly acuminate point. The median regions of the carapace are separated on either side from the branchial, either by a broad trench which bifurcates anteriorly to isolate the hepatic regions from the branchial regions and from the front, or by a shallow groove which has similar relations. The

front is broadish and broadly bilobed, and does not project as far as the salient edges of the afferent branchial canal.

The orbits are deep and completely conceal the eyes, their outer wall is marked by 3 closed sutures, the surfaces between which are very convex; there is a widish gap at the inner canthus where the antennæ with their small flagellum are found. The antennules fold obliquely.

The external maxillipeds are sunk altogether or in part a good deal below the level of the sharp edges of the buccal cavern: they are longitudinally hollowed or grooved along their inner border, the merus more deeply than the ischium: the last-named joint is about twice the length of the narrowly-triangular merus.

The chelipeds are hardly stouter than the slender legs: and are markedly less than twice the length of the carapace: the distal half of the hand is almost filiform: the fingers are hardly half the length of the hand, are filiform, and open in a vertical plane.

The abdomen of the male has the 3rd 4th and 5th segments coalescent, that of the female has the 3rd-6th coalescent.

Key to the Indian species of Ixa.

- I. Channels of carapace with very definite undermined edges: lateral processes with very abruptly acuminate tip: buccal frame distinctly triangular: exognaths with the surface concave and almost devoid of granules..... *I. cylindrus.*
- II. Channels of carapace simply grooves of no very remarkable appearance: lateral processes gradually tapering: buccal frame quadrangular: exognaths with the surface, in the basal three-fourths, tumid and covered with a mosaic of large granules *I. inermis.*

95. *Ixa cylindrus*, (Fabr). Leach.

Cancer cylindrus, Fabricius, Mantiss. Ins. I. 323, and Ent. Syst. II. 456.

Cancer cylindricus, Herbst, Krabben, I. ii. 109, pl. ii. figs. 29-31.

Leucosia cylindrus, Fabricius, Ent. Syst. Suppl. p. 352: Bosc, Hist. Nat. Crust.

I. 237: Latreille, Hist. Nat. Crust. et. Ins. VI. 119.

Ixa cylindrus, Leach, Trans. Linn. Soc. Vol. XI. 1815, p. 334: Bell, Trans. Linn. Soc. Vol. XXI. 1855, p. 311 (part): Miers, 'Challenger' Brachyura, p. 301 and footnote.

Ixa canaliculata, Leach, Zool. Miscell. III. p. 26, pl. 129, fig. 1: Desmarest, Consid. Crust. p. 171, pl. xxviii. fig. 3: Milne Edwards, Cuvier, Règne An., Crust. pl. xxiv. fig. 1, and Hist. Nat. Crust. II. 135: A. Milne Edwards, in Maillard's l'Île Réunion, Annexe F, p. 10.

Ixa megaspis, Adams and White, 'Samarang' Crust. p. 55, pl. xii. fig. 1 : Miers, 'Challenger' Brachyura p. 301 (var. of *cylindrus*).

Carapace covered with vesiculous granules between which it is smooth and polished, and there are some largish smooth patches on the branchial regions: the channels of the carapace are deep and very well defined, with undermining edges, and have the floor more or less coated with pubescence: the huge cylindrical lateral processes are of almost the same diameter at their distal end as at their base, and their rounded end is abruptly surmounted by a spine: the distance between the edge of the raised plane of the gastric region and the free edge of the front is nearly equal to the anterior breadth of the front: the ends of the posterior margin are a little thickened and prominent, but are hardly dentiform even in the young.

The buccal cavern, though truncated, has a distinctly triangular shape: the exognath, when denuded of its distal pubescence, is found to have a smooth and longitudinally concave surface, the concavity falling along the inner border; and is seen to fall short of the raised anterior edge of the afferent branchial channel by a mean distance equal to nearly half the length of the merus: the raised outer border of the ischium has a narrow band of vesiculous granules, wanting at the basal end.

Four males and four females (three adult) are in the Indian Museum collection from the Andamans, and from the Madras coast in the neighbourhood of Palk Straits.

The largest female has the carapace 20 millim. long by 60 millim. in extreme breadth.

96. ? *Ixa inermis*, Leach.

Ixa inermis, Leach, Zool. Miscell. III. p. 26, pl. 129, fig. 2: Desmarest Consid. Crust. p. 171: Milne Edwards, Hist. Nat. Crust. II. 135: Haswell, P. L. S., N. S. Wales, IV. 1879, p. 59, and Cat. Austral. Crust. p. 132.

Carapace covered with vesiculous granules between which it is distinctly rough: the channels of the carapace are merely grooves, and are devoid of pubescence: the lateral processes are curved forwards, and taper gradually to a point: the distance between the gastric region (no part of which region has the form of a definitely raised plane) and the free edge of the sharply bidentate front is much less than the anterior breadth of the front: there is a large granular petaloid tubercle at either end of the posterior margin.

The buccal cavern is distinctly quadrangular, owing to the eversion of the outer lip of the afferent branchial channel: the exognath in its basal three-fourths is very strongly convex, the surface of the convexity

being covered with large polished pearly granules polygonal by mutual appression; its hairy distal end is suddenly depressed and does not fall much short of the front edge of the afferent branchial canal: the ischium is grooved along its inner border, but the rest of its surface is tumid and granular just like the exognath.

In the Indian Museum collection is a single female with the carapace 17 millim. long by 42 millim. in extreme breadth, from 23 fathoms off the Orissa Coast.

I believe that this species must be Leach's *Ixa inermis*, as it corresponds with Leach's figure. Unfortunately the mouth-parts are not figured or described. They are most characteristic in this species, which cannot be mistaken for *I. cylindrus*.

Family DORIPPIDÆ.

Dorippiens, Milne Edwards, Hist. Nat. Crust. II. 151 (*partim*).

Dorippidea, De Haan, Faun. Japon. Crust. p. 120.

Dorippidæ, Dana, U. S. Expl. Exp. Crust. pt. I. p. 390.

Dorippidæ, Miers, Challenger Brachyura, p. 326.

Carapace flat, generally broadest behind near the plane of the posterior border, hiding not much more than half of the abdominal terga, the first three of which are commonly visible in a dorsal view quite uncovered. The orbits are somewhat incomplete. The antennules are commonly too large to fold inside their fossettes. The antennæ are large. The mouth-parts somewhat resemble those of the *Calappidæ*: the buccal cavern is prolonged forwards to form an efferent branchial canal which is covered in below by a long lamellar process of the first maxillipeds. The first two pairs of true legs are remarkably long and stout: the last two pairs on the contrary are remarkably short and slender, and occupy a singular position in the dorsal plane of the body. The position of the afferent branchial canal varies. The vasa deferentia perforate the 5th thoracic sternum on either side. The branchiæ are less than nine in number on either side.

The Dorippidæ may be divided into two sections or subfamilies as follows:—

1. *Dorippinæ*, in which the external maxillipeds leave a considerable part of the buccal cavern uncovered, and in which the afferent branchial openings are situated either immediately or shortly in advance of the bases of the chelipeds.

2. *Tymolinæ*, in which the external maxillipeds almost completely cover the buccal cavern, and in which the afferent branchial openings may or may not be situated near the bases of the chelipeds.

The following is a list of known genera, Indian genera being printed in Roman type and genera known to me by autopsy being marked with an asterisk,

Family Dorippidæ.

Sub-family I. *Dorippinæ*.

*Dorippe.

*Ethusa (*Ethusina).

? *Cymopolus*, A. Milne Edwards, Bull. Mus. Comp. Zool. VIII. 1880, p. 27.

Sub-family II. *Tymolinæ*.

Tymolus, Stimpson, Proc. Acad. Nat. Sci. Philad., 1858, p. 163.

Cyclodorippe, A. Milne Edwards, Bull. Mus. Comp. Zool. VIII. 1880, p. 24.

Cymonomus, A. Milne Edwards, Bull. Mus. Comp. Zool. VIII. 1880, p. 26.

*Cymonomops.

Uncertain in position.

Corycodus, A. Milne Edwards, Bull. Mus. Comp. Zool. VIII. 1880, p. 23.

It appears to me to be quite possible that further investigation may discover *Cyclodorippe* to belong to Stimpson's genus *Tymolus*. Ortmann, (Zool. Jahrbucher, Syst. VI. 1892, p. 559) has already suspected the identity of these two genera.

Caphyra, Guérin, which was included with the *Dorippidæ* by Milne Edwards, has by other authors been shown to belong to quite another section of the Brachyura; and I cannot think that *Cymopolia* either has any right to be classed with the *Ocystoma*. Previous authors also, such as Dana (U. S. Expl. Exped. Crust. pt. I. p. 403) and Miers ('Challenger' Brachyura p. 334) have suggested the advisability of removing *Cymopolia* from this group.

Key to the Indian Genera of Dorippidæ.

I. The external maxillipeds leave all the anterior part of the buccal cavern uncovered:—

1. The anterior extremity of the buccal cavern passes between the antennules to or even beyond the tip of the front: the afferent branchial apertures are

- situated in front of the bases of the chelipeds, a bridge of the carapace intervening DORIPPE.
2. The anterior extremity of the buccal cavern either stops at, or does not reach as far as, the basal joint of the antennules: the afferent branchial openings are situated *immediately* in front of the bases of the chelipeds ETHUSA.
- II. The external maxillipeds are greatly elongate and do not leave any appreciable portion of the buccal cavern uncovered: the afferent branchial openings are not situated in front of the bases of the chelipeds CYMONOMOPS.

Dorippe, Fabricius.

Dorippe, Fabricius, Ent. Syst. Suppl. p. 361.

Dorippe, Milne Edwards, Hist. Nat. Crust. II. 154.

Dorippe, Miers, Challenger Brachyura, p. 327.

Carapace very flat, truncate-triangular and broadest behind, covering little more than the first two thoracic sterna, its regions well defined, the hepatic region small.

The front consists of two flat triangular teeth: on either side of it, in the same plane, are (1) a hood-like fold covering the base of the long completely exposed geniculate eyestalks, and separated by a deep narrow fissure from (2) a long flat triangular tooth, formed by the prolongation of the antero-external angle of the carapace, and forming the outer angle of the orbit. The floor of the orbit is even more incomplete than the roof, and is formed almost entirely by the base of a great projecting spine at the inner canthus, but even this spine may be rudimentary. The antennules fold longitudinally, they are too large to fold into the fossettes. The antennæ also are rather large: the basal joint is wedged in between the front and the spine at the inner canthus of the orbit.

The buccal cavern is abruptly narrowed anteriorly and prolonged as a deep well defined canal to, or even slightly beyond, the front: the canal is closed in below by long stout foliaceous processes of the first maxillipeds. The external maxillipeds do not cover this canal: their flagellum or palp arises at the outer angle of the long narrow merus and is completely exposed in flexion. The afferent branchial orifices are oblique pocket-like slits in the pterygostomian region.

The chelipeds in the adult male are commonly unequal, having the hand of one side much enlarged and swollen.

The first and second pairs of true legs are long stout and compressed: the last two pairs on the other hand are short and rather slight; they arise much dorsad of the other legs, and are subchelate,—the four subchelæ being so disposed as to enable the animal to hold over its back—as in a loose frame—some sort of defensive or protective object, such as a lamellibranch shell or an inhabited worm-tube.

The abdomen of both sexes consists of seven distinct segments, the first two and most of the third terga being visible in a dorsal view.

Key to the Indian species of Dorippe.

- I. The tips of the foliaceous processes that close the endostomial canal, but never the canal itself, may sometimes be seen between the frontal teeth in a dorsal view:—
 1. The greatest length of the carapace is slightly, but distinctly, more than the greatest breadth:—
 - i. Carapace nodular and wrinkled: spine at the inner canthus of the orbit ponderous, curved, serrated along the under surface: fourth (last) pair of true legs less than half the length of the second (longest) pair *D. dorsipes.*
 - ii. Carapace smooth: spine at inner canthus of orbit rudimentary: fourth pair of true legs more than half the length of the second..... *D. astuta.*
 2. The greatest length of the carapace is less than the greatest breadth: spine at the inner canthus of the orbit long, slender, acute, straight: carapace smooth: fourth pair of legs from a little less than half to one-third the length of the second:—
 - i. Carapace and last two pairs of legs densely pubescent: both edges of merus and posterior edge of carpus and propodite of 1st and 2nd legs densely pubescent in the male *D. facchino.*

ii. Carapace hardly pubescent: last two pairs of legs very slightly hairy: 1st and 2nd legs perfectly devoid of hair

D. granulata.

II. The roof of the endostomial canal projects considerably between the bases of the frontal teeth in a dorsal view: the greatest length of the carapace is hardly less than the greatest breadth: carapace smooth, it and all the appendages perfectly devoid of pubescence: spine at inner canthus of orbit rudimentary: last pair of legs much more than half the length of the second (longest) pair.....

D. polita.

97. *Dorippe dorsipes*, (Linn.) Miers.

Cancer dorsipes, Linn. Mus. Lud. Ulr. p. 452, and Syst. Nat. ed. xii. I. ii. 1053 (nec syn.)

Cancer frascone, Herbst, Krabben, I. ii. 192, pl. xi. fig. 70.

Cancer quadridens, Fabricius, Ent. Syst. II. 464.

Dorippe quadridens, Fabricius, Ent. Syst. Suppl. p. 361: Bosc, Hist. Nat. Crust. I. 207: Latreille, Hist. Nat. Crust. et Ins. VI. 125, [and Encycl. pl. 306, fig. 1]: Desmarest, Consid. Crust. p. 135: De Haan, Faun. Japon. Crust. p. 121, pl. xxxi. fig. 3: Stimpson, Proc. Ac. Nat. Sci. Philad. 1858, p. 163: de Man, Journ. Linn. Soc., Zool., XXII. 1888, p. 206.

Dorippe quadridentata, Milne Edwards, Hist. Nat. Crust. II, 156: Hilgendorf, MB. AK. Berl. 1878, p. 812: E. Nauck, Zeits. Wiss. Zool. XXXIV. 1880, p. 49 (gastric teeth): Haswell, Cat. Austral. Crust. p. 137.

Dorippe dorsipes, Miers, Zool. H. M. S. 'Alert,' pp. 185, 257: de Man, Archiv. für Naturges. LIII. 1887, i. 393: [Cano, Boll. Soc. Nat. Napol. III, 1889, p. 254]: Ortmann, Zool. Jahrbuch., Syst., VI. 1892, p. 562: Henderson, Trans. Linn. Soc. Zool. (2) V. 1893, p. 404.

Dorippe atropos, Lamarck, Syst. Anim. sans. vert. p. 245 (1818).

Dorippe nodulosa, Lamarck, Syst. Anim. sans. vert. p. 245 (1818): Bosc, Hist. Nat. Crust. I. 203, pl. iv. fig. 2; Guérin, Icon. Règne Animal, pl. xiii. fig. 2.

Body and appendages (except the hands and fingers, and the propodites and dactyli of the 1st and 2nd true legs) rather thickly covered with hair.

Extreme length of carapace greater than extreme breadth. Surface of carapace wrinkled and uneven, with about a dozen nodules, which are often granular; the regions well defined by grooves and puckers.

The spine at the outer angle of the orbit is long and acute, and usually projects well beyond the level of the frontal teeth: the spine at the inner canthus is huge, curved, serrated along the lower border,

and projects far beyond the frontal teeth: the hood-like fold, on either side of the front, that covers the base of the eyestalks, has its angles not pronounced.

The lateral margins of the carapace are denticulated up to a stoutish tooth near the middle of the branchial border.

The abdomen of the male has both on the second and on the third terga a transverse row of 3 tubercles, the middle one large rounded and polished, the lateral ones smaller and acute, and one stout tubercle in the middle line on the fourth tergum: in the female the third fourth and fifth terga are transversely carinate, the carinæ being denticulate, and one tooth on the third and 4th terga, in the middle line, being much enlarged; the second tergum is also transversely carinate, but bluntly and indistinctly.

The chelipeds of the adult male are asymmetrical, the hand of one side being greatly swollen and being a good deal broader than long: in both chelipeds the ischium merus and carpus have the outer surface covered with spinules and acute granules.

The second true leg is more than twice the length of the fourth, and nearly three times the length of the carapace: its carpus like that of the first is traversed longitudinally by two granular crests.

Large males have the carapace 36 millim. long, and 34 millim. in extreme breadth: ovigerous females have the carapace 25 millim. long by 24 millim. broad.

In the Indian Museum collection are very numerous specimens from Mergui, Andamans, East coast of India from Ganjam to Palk Straits, and Persian Gulf.

As Miers states, there can be little doubt that Linnæus' diagnosis (Mus. Lud. Ulr. p. 452) refers to this species. But De Haan long before (Faun. Japon. Crust. pp. 121, 139) had bespoken the identity of *D. dorsipes* and *D. quadridens* and had noticed the confusion by earlier authors of *Cancer dorsipes* of Linnæus with *Cancer dorsipes* of Fabricius.

98. *Dorippe facchino* (Herbst), De Haan.

Dorippe facchino, Herbst, Krabben, I. ii. 190, pl. xi. fig. 68: De Haan, Faun. Japon. Crust. p. 123: Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 163: Miers, 'Challenger' Brachyura, p. 328: Ortmann, Zool. Jahrbuch., Syst. VI. 1892, p. 561: J. R. Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 405.

Dorippe sima, Milne Edwards, Hist. Nat. Crust. II. 157, pl. xx. figs. 11-14: Dana, U. S. Expl. Exp. Crust. pt. I. p. 398: Miers, Ann. Mag. Nat. Hist. (5) V. 1880, p. 317: A. O. Walker, Journ. Linn. Soc., Zool., XX. 1886-90, p. 111.

The body and appendages though on the whole very hairy, are not quite so hairy as in *D. dorsipes*; the chelipeds have the hair confined almost entirely to their borders, especially the upper border; the 1st and 2nd pairs of legs are almost hairless in the female, and in the male have the hair confined to the anterior border of the merus and the posterior border of the merus carpus and propodite; and hair is absent from the convexities of the thoracic sterna.

Extreme length of carapace considerably less than extreme breadth.

The surface of the carapace, when denuded, is either perfectly smooth, or smooth in the middle and finely granular at the sides and in front: the regions are well defined by grooves.

The hood-like fold covering the base of the eyestalks, on either side of the front, has its inner or anterior angle dentiform: the spine at the external orbital angle is broad and suddenly acuminate, and projects to but not beyond the level of the frontal teeth: the spine at the inner canthus is slender, straight, and acute, and projects well beyond the frontal teeth.

The lateral borders of the carapace are sometimes granular, but never denticulate.

The abdomen of the male is unarmed: in the female the 3rd-5th terga are coarsely and bluntly carinate, the carinæ of the 4th and 5th being finely granular. The chelipeds when denuded have all their joints quite smooth: those of the adult male are asymmetrical just as in *D. dorsipes*.

The second true leg is much more than twice, often three times, the length of the fourth, and $2\frac{1}{2}$ to $2\frac{2}{3}$ times the length of the carapace: its carpus, like that of the first is bicarinate, the carinæ being granular under the lens but not to the naked eye.

Large males have the carapace 29 millim. long and 34 millim. in extreme breadth: ovigerous females have the carapace 20 millim. long by 24 millim. broad.

In the Indian Museum are very numerous specimens from the East coast from the mouth of the Hooghly to Madras, and a few from the Andamans. It is common on soft muddy bottoms, and I have rarely found it without a protective bivalve shell and sea-anemone.

99. ? *Dorippe granulata*, De Haan.

Dorippe granulata, De Haan, Faun. Japon. Crust. p. 122, pl. xxxi. fig. 2: Stimpson Proc. Acad. Nat. Sci. Philad., 1858, p. 163: [Targioni-Tozzetti, Zool. Record, 1877, Crust. p. 19]: Ortmann Zool. Jahrbuch., Syst., VI. 1892, p. 561.

Almost exactly resembles *D. facchino* (Herbst), but has the carapace a little more granular and with scanty or obsolete pubescence.

There is almost no hair on the carapace,—none sufficient to conceal its grooving and texture: on the chelipeds there is, on the upper edge, extending along basal part of finger, a narrow fringe of hair, and on the lower edge a narrow fringe extending as far as the end of the merus: on the first two pairs of true legs there is no hair at all in either sex; and on the last two pairs of legs there is not very much hair.

The chelipeds of males that are as big as the largest ovigerous females are hardly asymmetrical.

Ovigerous females have the carapace 14 millim. long and 16 millim. in extreme breadth.

In the Indian Museum collection are 21 specimens from various stations along the shores of the Bay of Bengal from Mergui to Madras, one of these—the smallest and most immature of all—belongs to Dr. Anderson's Mergui collection and is referred to in Dr. de Man's report (J. L. S., Zool., Vol. XXII) as allied to *D. granulata*.

If they are not De Haan's species, they are a mere variety of *D. facchino*.

100. *Dorippe astuta*, Fabr.

Dorippe astuta, Fabricius, Ent. Syst. Suppl. p. 361.

Cancer astutus, Herbst, Krabben, III. iii. 45, pl. lv. fig. 6.

Dorippe astuta, Bosc, Hist. Nat. Crust. I. 208: Milne Edwards, Hist. Nat. Crust. II. 157: Haswell, Cat. Austral. Crust. p. 136: A. O. Walker, Journ. Linn. Soc., Zool., Vol. XX. 1886-90, p. 111: Ortmann, Zool. Jahrbuch., Syst., VI. 1892, p. 562: Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 405.

Body and appendages not pubescent as in *D. dorsipes* and *facchino*, but covered with short distant hairs that are not very plainly visible to the naked eye: the hairs on the edges of the propodites and dactyli of the first two pairs of true legs, however, form a long thick fringe.

The carapace is extremely flat, almost laminar; its surface is smooth, and the regions are defined by grooves.

Extreme length of carapace a little greater than extreme breadth.

The spine at the outer angle of the orbit does not nearly reach to the level of the tip of the frontal teeth: the part of the carapace that covers the base of the eyestalk is not hood-like, and has not its angles pronounced: the spine at the inner canthus of the orbit is quite rudimentary.

The lateral margins of the carapace are smooth. The abdomen of the male is unarmed, that of the female has the 3rd and 4th terga bluntly and very inconspicuously carinate transversely.

The chelipeds are smooth when denuded; in the adult male they are asymmetrical just as in *D. dorsipes* and *facchino*.

The second true leg is three times as long as the carapace, and very much less than twice the length of the fourth leg.

The adult male has the carapace 12 millim. long and 11.5 millim. broad, as has also the apparently adult female.

In the Indian Museum collection are eight specimens from the Andamans, Mergui, Orissa coast, and Karáchi.

Several of them are encrusted with a small species of *Scalpellum*, and one carries across its back a large (inhabited) worm-tube, which is said by Dr. Giles to be a habit with this species.

101. *Dorippe polita*, Alcock and Anderson.

Dorippe polita, Alcock and Anderson, J. A. S. B., Vol. LXIII. 1894, pt. 2, p. 203, and Ill. Zool. 'Investigator,' Crustacea, pl. xxiv. fig. 4 (*in the press*).

General surface of the body and appendages smooth, hard polished and free of hairs: there are a few scanty hairs on the edges only of some of the joints of the chelipeds and external maxillipeds.

The extreme length of the carapace is a very little less than the extreme breadth: the grooves that define the regions are shallow and not very conspicuous. The end of the endostomial channel projects between, and a little beyond the tips of the frontal teeth; and has its free edge emarginate, so that the front appears to consist of four sharp lobes, the median two of which are on a lower level than the other two.

The spine at the outer angle of the orbit is broadly triangular, its tip scarcely surpasses the level of the tips of the frontal teeth: the spine at the inner canthus is blunt and very small and inconspicuous: the portion of the carapace that covers the base of the eyestalk is, as in *D. astuta*, in simple continuity with the side of the front.

The abdominal terga of the female are smooth and polished.

The second pair of true legs are about $2\frac{1}{3}$ times the length of the carapace and are very much less than twice the length of the fourth pair; their carpopodites, like those of the first pair, are faintly bicarinate. The pleura covering the bases of the last two pairs of legs are singularly large.

The larger of two ovigerous females in the Indian Museum collection has the carapace 11.5 millim. long and 12 millim. in extreme breadth.

Madras coast, 7 fath. (type-locality).
Ethusa, Roux.

Ethusa, Roux, Crust. de la Méditerranée, pl. xviii. and text relating thereto.

Ethusa, Milne Edwards, Hist. Nat. Crust. II. 161.

Ethusina, S. I. Smith, 'Albatross' Crustacea, 1883, in Ann. Rep. U. S. Comm. Fish, &c., 1882 (1884).

Ethusa, Miers, 'Challenger' Brachyura, pp. 328, 331.

Carapace shaped much as in *Dorippe*. The front consists of two laminar teeth each of which again is bifid at tip: on either side of the front, and separated from it by a deep cleft, is a long flat tooth or spine formed by the prolongation of the antero-external angle of the carapace, and forming the outer angle of the orbit. There is practically no orbital floor. The antennules fold obliquely: they are large, but fold fairly well into their fossæ. The antennæ have a long flagellum: their basal joint is inserted between the eyestalk and the basal antennular joint, but on a slightly lower level.

The buccal cavern is elongate-triangular and does not extend to the front: the external maxillipeds cover only its basal three-fourths; or thereabout, somewhat as in *Dorippe*, but the distal part is closed in by stout foliaceous processes of the first maxillipeds. The flagellum or palp of the external maxillipeds arises near the antero-external angle of the rather broad merus, and is completely exposed in flexion.

The afferent branchial orifices are wide openings immediately in front of the bases of the chelipeds.

The chelipeds in the adult male are often unequal: the legs have the same form and relations as in *Dorippe*, but the last two small and dorsally placed pairs are not subchelate, although their little hook-like dactylus folds backwards. The dactyli of the 1st and 2nd pairs are palmulate and are very long and stout. The abdomen of the male usually consists of 5 pieces, the 3rd-5th terga being fused, that of the female consists of 7 separate terga. As in *Dorippe* the first three terga are visible in a dorsal view.

There is very little hair about the carapace and larger appendages.

In the Indian seas the species of this genus are, so far as is known, found only at depths of between 200 and 1,300 fathoms.

Key to the Indian species of Ethusa.

I. Carapace barely longer than broad: basal antennular joint not abnormally enlarged and swollen: eyestalks freely movable:—

1. Branchial regions much swollen, and causing a strong bulge of the lateral borders of the carapace posteriorly: external orbital spines long slender acute, and projecting obliquely:—

i. External orbital spines projecting beyond the frontal spines *E. indica*.

ii. External orbital spines not projecting to the level of the frontal spines ... *E. pygmæa*.

2. Lateral borders of the carapace gradually convergent without any strong bulge in their posterior (branchial) part: external orbital spines short broad flat triangular, with a mucronate tip

E. andamanica.

II. Carapace manifestly longer than broad: basal antennular joint enormously enlarged and swollen, globular in shape, pushing the eyes permanently outwards:—

1. Eyes practically immobile: chelipeds in the male symmetrical.....

E. investigatoris.

2. Eyes preserving good power of movement: one cheliped in the male very markedly larger than the other.....

E. desciscens.

102. *Ethusa indica*, Alcock.

Ethusa indica, Alcock, Ann. Mag. Nat. Hist., May, 1894, p. 405, and Ill. Zool. 'Investigator,' Crust. pl. xiv. fig. 2, ♀.

Carapace convex; its extreme length, including the frontal teeth, in the male only just exceeds, and in the female equals, its extreme breadth; its surface is finely and closely granular almost everywhere, except sometimes on the cardiac-intestinal region.

The branchial regions are much swollen, both dorsally and laterally, the lateral swelling making the carapace more than one-third broader across the middle of the branchial regions than across the bases of the external orbital spines. The cardiac-intestinal region is small and well defined, and although it is tumid it is commonly sunk below the level of the branchial convexities. The anterior regions of the carapace are undefined.

The spine at the external orbital angle is broad-based, but long slender and acute: it projects obliquely outwards well beyond the tips of the frontal teeth. The two pairs of frontal teeth are longish and acute—the outer pair being somewhat the longer: they as well as the external orbital spine are a good deal concealed in a fringe of long hairs.

The eyestalks are short slender and freely movable: the eyes are often a little deficient in pigment.

The basal antennular joint is not abnormally enlarged.

The chelipeds in the adult male only are asymmetrical, all the joints of one side being enlarged in all dimensions: the smaller cheliped is hardly as stout as the first two pairs of legs.

The second pair of true legs are not very much longer than the first: in the adult male they are a little more than three times the

length of the carapace, and slightly more than three times the length of the 4th (last) pair; in the female they are not quite three times the length of the carapace, and about $2\frac{3}{4}$ times the length of the 4th pair.

The abdomen of the male consists of 5 pieces, the 3rd-5th terga being fused together.

The extreme length of the carapace is in the fully adult male 16.5 millim., in the fully adult female 15 millim.; the breadth 16 millim. in the male, 15 millim. in the female.

Has been dredged in the Andaman Sea at 240 fms., in the "Swatch" of the Gangetic Delta at 409 and at 405 to 285 fms., in the Laccadive Sea at 696 fms., off the Maldives at 719 fms., and off both coasts of Ceylon at 406 to 296 fms.

103. *Ethusa pygmæa*, Alcock.

Ethusa pygmæa, Alcock, Ann. Mag. Nat. Hist., May 1894, p. 406, and Ill. Zool. 'Investigator,' Crust. pl. xiv. fig. 5, ♀.

Distinguished from *E. indica* only in the following particulars:—

(1) its size is much smaller, the largest known specimen—an ovigerous female—having the carapace slightly over 6 millim. long and nearly 7 millim. broad:

(2) the external orbital spines, though of the same slender acute shape, are not so prominent, not reaching as far as the tips of the frontal teeth:

(3) the anterior regions of the carapace are plainly defined by grooves.

Andaman Sea 188 to 220 fathoms, and 240 to 220 fms.

104. *Ethusa andamanica*, Alcock.

Ethusa andamanica, Alcock, Ann. Mag. Nat. Hist., May 1894, p. 405, and Ill. Zool. 'Investigator,' Crust. pl. xiv. fig. 8, young ♀.

Carapace flat, its extreme length only just exceeds its extreme breadth, its surface finely granular under the lens, but smooth to the naked eye.

The branchial regions are a little tumid dorsally, but do not bulge laterally, so that the convergent lateral borders are nearly straight.

The external orbital spine is broadly triangular, with a mucronate tip which does not quite reach to the tips of the frontal spines; these also are acutely triangular, and all are a good deal hidden by a fringe of long hairs.

The eyestalks are short and rather stout, movable, but not very freely so: the eyes are not deficient in pigment. The basal antennular joint is not enlarged.

The chelipeds of the adult male are unknown : in the female they are not so stout as the first two pairs of legs.

The second pair of legs in the female (adult male unknown) exceed the first almost by the length of the dactylus, they are three times the length of the carapace and about $2\frac{1}{2}$ times the length of the 4th pair.

The extreme length of the carapace of the largest specimen, which is not adult, is 9.5 millim., the extreme breadth 9 millim.

Andaman Sea 188 to 220 fms., and 238 to 290 fms.

This species may possibly be only a variety of *Ethusa orientalis*, Miers, Challenger Brachyura, p. 330, pl. xxviii. fig. 4.

105. *Ethusa (Ethusina) investigatoris*, n. sp.

Carapace manifestly longer than broad, somewhat convex, smooth to the naked eye though finely granular under the lens.

The branchial regions are a good deal swollen both dorsally and laterally, bulging out the lateral margins and making the carapace a third broader across the middle of the branchial regions than across the bases of the external orbital spines.

The cardiac-intestinal region is well-defined and tumid, but not sunk below the level of the branchial convexities : the anterior regions of the carapace are fairly well defined.

The frontal portion of the carapace is separated from the rest of the carapace by a transverse groove or crease. The external orbital spine is long and needle-like, but its tip falls considerably short of the tips of the rather long acute frontal spines.

The basal antennal joint is huge and swollen, almost globular in shape. Owing to its size the eyes are pushed outwards until the eye-stalks have come to lie almost in the transverse axis of the carapace, with the tips of the eyes just visible, dorsally, beyond the lateral edge of the external orbital spine ; and in this position they are almost immovably fixed.

The chelipeds in the apparently adult male are symmetrical and are not much stouter, except as to the hands, than the first two pairs of legs ; the hands, however, are somewhat enlarged.

The second pair of true legs exceeds the first by about a third of the length of the dactylus ; they are more than three times the length of the carapace, and about $2\frac{3}{4}$ times the length of the 4th pair.

The abdomen of the male consists of 5 pieces, the 3rd-5th terga being fused together.

Length of carapace of an adult male 12.3 millim., extreme breadth 11.3 millim.

Colours in life milk-white with the tip of the legs faint pink.

Bay of Bengal 1300 fathoms, Laccadive Sea 1200 fms.

This species may possibly be only a variety of *Ethusa* (*Ethusina*) *gracilipes*, Miers, Challenger Brachyura, p. 332, pl. xxix. fig. 1.

106. *Ethusa* (*Ethusina*) *desciscens*, n. sp.

Only differs from *E. investigatoris* (1) in its smaller size, (2) in having the eyestalks somewhat more mobile, and (3) in having the hand of one cheliped (in the male) much larger than the other.

I should have regarded it as a variety of *E. investigatoris* but that two specimens coming from very different localities and depths present the same peculiarities.

Length of carapace of largest specimen 9 millim., extreme breadth 8 millim.

Andaman Sea 265 fathoms, Laccadive Sea 912 to 931 fms.

Cymonomops, Alcock.

Cymonomops, Alcock, Ann. Mag. Nat. Hist., May 1894, p. 406.

Allied to *Cyclodorippe*, *Cymonomus*, etc.

Carapace of the *Dorippe* type (that is to say having its greatest breadth at its extreme posterior limit and leaving about half of the abdominal terga exposed to dorsal view), but arched anteriorly almost in a semicircle; its regions well defined in much the same way as *Dorippe*. The front is narrow and the whole fronto-orbital region lies well inside the semicircular curve of the antero-lateral margins: the narrow front ends in two little teeth between and beyond which can be seen the roof of the greatly prolonged buccal cavern, as in *Dorippe polita*. On either side of the front is a spine that forms the roof of the orbit, and outside of this spine, and separated from it by a deep notch, is a spine that forms the outer wall of the orbit.

The eyestalks are slender, moderately long, and freely movable: the eyes are almost without pigment.

The antennules have their basal joint lodged in a deep crevice between the edge of the anterior prolongation of the buccal cavern and the antennæ: their long flagellum cannot be concealed in flexion. The antennæ are large, but are much smaller than the antennules.

The buccal cavern is of great size,—not much less than half the length of the body, and is gradually narrowed anteriorly, and prolonged beyond the tip of the front: it is closed, except at its extreme frontal tip, by the long narrow external maxillipeds, the merus of which is not very much shorter than the ischium measured along the inner border and the flagellum of which is exposed in flexion: the long narrow pointed exognath is not much longer than the ischium: beneath the

external maxillipeds the anterior prolongation of the buccal cavern is closed in below by a lamellar process of the first maxillipeds.

The chelipeds in both sexes are short, massive, and equal and symmetrical: the hands are of the chopper-shaped, almost subcheli-form, Raninoid type, the stout fingers being almost at right angles to the long axis of the hand.

The first and second pairs of true legs are stout and are of great length, their merus being of relatively enormous length: the third and fourth pairs on the other hand, which are dorsal in position as in *Dorippe*, are extremely short and of filiform tenuity.

The abdomen in both sexes consists of six segments: in the male two or three of them are fused and the whole abdomen is very small, in the female the last segment is of great size.

[? The afferent branchial opening appears to lie in the deep crevice between the base of the antennæ and the edge of the buccal frame in which the basal joint of the antennules is lodged.]

107. *Cymonomops glaucomma*, Alcock.

Cymonomops glaucomma, Alcock, Ann. Mag. Nat. Hist., May 1894, p. 406, and Ill. Zool. 'Investigator,' Crustacea pl. xiv. fig. 9.

Carapace subcircular; it and the appendages are very closely and finely granular beneath a dense pubescence. The front consists of three deeply cut lobes, the middle one of which is the true front and is the largest and most prominent. The middle lobe again is slightly cleft at the tip, and in the cleft is to be seen projecting the roof of the remarkably prolonged buccal cavity.

The external orbital angle, which is somewhat ventrad in position, also forms a projecting tooth, so that the orbito-frontal region, which is sharply delimited from the rest of the inflated carapace, has the form of a five-pronged crest or crown. The regions of the carapace are plainly delimited, excepting only in the case of the boundary between the gastric and cardiac regions. The pterygostomian regions are most remarkably puffed out.

The abdomen (in the female) is large, and the terminal segment has the form of a broad semicircular plate, broader than any of the other segments and nearly as long as all of them put together: in the male the abdomen is very small.

The orbits are capacious, but the eyestalks are slender and the eyes are unpigmented and semi-opaque.

The antennules, which are much larger and longer than the antennæ, are incapable of flexion beneath the front.

The external maxillipeds are of great length, in correspondence with

the remarkable trough-like prolongation of the buccal cavity, which they completely close in below; their meropodite, which is prolonged far beyond the insertion of the palp, covers the bases of the antennules and antennæ, their tips in fact being visible from above; the slender exopodite does not much surpass the ischium.

The chelipeds are short but massive, and are equal, the merus is curved, the carpus is very small, the palm is large and tumid, and the fingers which are set almost at right angles to the hand, are broad, compressed, pointed, very closely apposable, and have their cutting-edge very finely denticulated.

The second and third legs are of great length, being more than four times the length of the body, the merus forming more than half their extent; their dactylus is filiform and is not much longer than their protopodite. The fourth and fifth legs have the family position, but are mere rudiments, being of hair-like tenuity and only about three-fourths of the carapace in length; the fifth ends in a hook-like dactylus.

A female from the Andaman Sea, 405 fathoms, has the following dimensions:—Length of carapace 6·5 millim., breadth 6·5 millim., length of cheliped 9 millim., length of second leg 28·5 millim., of fourth leg 4·5 millim. A male from the Andaman Sea, 265 fathoms, is smaller.

Colour in the fresh state chalky pink.

Family RANINIDÆ.

Raniniens, Milne Edwards, Hist. Nat. Crust. II, 190.

Raninoidea, De Haan, Faun. Japon. Crust. p. 136.

Raninidea, Dana, U. S. Expl. Exp. Crust. pt. I. pp. 400, 403.

Raninidea, Henderson, 'Challenger' Anomura, p. 26.

Carapace much longer than broad, remarkably elongate and convex from side to side, commonly obconical or obovate in outline, the greatest breadth being at or close behind the level of the front. Abdomen narrow in both sexes, the greater number of the terga fully exposed in a dorsal view. The sternum is elongate, broad between the first pair or first two pairs of legs, and then becoming narrow and finally linear.

The true front is narrow: in the same plane with it the antero-external angle of the orbit is usually produced, somewhat as in *Dorippe*, to form a spine; and between the two is the orbit.

Except in the deep-sea forms the eyestalks are long. The orbits are very complete, except sometimes on the ventral aspect, where the large basal joints of the antennules and antennæ serve in large part as an orbital floor.

The antennules are large, but do not fold into fossettes. The antennæ also are large, and arise on a plane more or less ventrad of the antennules.

The buccal cavern is remarkably elongate, and is completely closed by the external maxillipeds. As in all other *Oxystoma* the efferent branchial channels form a canal in the middle of the endostome, which canal is covered by a lamellar prolongation of the exopodites of the first maxillipeds: as in *Dorippe* the canal is prolonged forwards between the bases of the antennules.

As in the *Leucosiidæ* the afferent branchial channels are not found in front of the bases of the chelipeds.

Somewhat in the same way as in the *Leucosiidæ* the palp of the external maxillipeds is small and arises at the far end of a groove along the inner edge of the merus, so as to be completely concealed in repose: the exognath is very narrow, and, as in the *Tymolinæ*, does not reach very far beyond the end of the ischium of the endognath.

Except in *Zanclicer* the chelipeds have the hand broad flat and somewhat chopper-shaped, the fingers (which form the head of the chopper) being at right angles, or nearly so, with the long axis of the hand; and as the immobile finger springs from a very broad base, the chelæ rather resemble subchelæ.

The legs commonly have the propodite broad or foliaceous, and the dactylus foliaceous or very broadly palmulate, somewhat as in *Matuta*: the last pair of legs is in, and the penultimate pair approaches, the dorsal plane of the body.

The genital ducts of the male perforate, and protrude far beyond, the bases of the fifth pair of legs: those of the female perforate the bases of the third pair of legs.

The following genera belong to this family. Indian genera are printed in Roman type and those represented in the Indian Museum collection are marked with an asterisk:—

Family **Raninidæ**.

* *Cosmonotus*.

* *Lyreidus*.

* *Notopus*.

Notopoides, Henderson, 'Challenger' *Anomura*, p. 29.

Ranilia, Milne Edwards, *Hist. Nat. Crust.* II. 195.

* *Ranina*, Lamarck, Milne Edwards, *Hist. Nat. Crust.* II. 191.

* *Raninoides*.

Raninops, A. Milne Edwards, *Bull. Mus. Comp. Zool.* VIII. 1880, p. 34.

Zanclicer, Henderson, 'Challenger' *Anomura*, p. 34.

Key to the Indian genera of Raninidæ.

- I. Last pair of legs of normal size: antennæ with a very stout peduncle that hides the antennules: antennary flagellum long and stiff:—
1. A well-developed rostral spine..... *Notopus*.
 2. A V-shaped excision in the carapace in place of a rostrum..... *Cosmonotus*.
- II. Last pair of legs abnormally small and slender—almost filiform: antennary peduncle not completely hiding the antennules: antennary flagellum small:—
1. Fronto-orbital border more than half the width of the carapace: sternum broad as far as the third pereopods: merus of the external maxillipeds shorter than the ischium *Raninoides*.
 2. Fronto-orbital border less than half the width of the carapace: sternum broad only as far as the second pereopods: merus of the external maxillipeds a little longer than the ischium *Lygreidus*.

Notopus, De Haan.

Notopus, DeHaan, Faun. Japon. Crust. pp. 137, 138.

Notopus, Henderson, 'Challenger' Anomura, p. 31.

Carapace obovate or obconical in outline, strongly convex from side to side, nearly smooth: regions undefined. Fronto-orbital border more than half the breadth of the carapace. Eyes distinct, eyestalks long slender and cylindrical, orbits oblique.

Antennules much smaller than the antennæ. Antennæ with a long very stout peduncle and long stout flagellum, the peduncle concealing the antennular peduncle. Merus of the external maxillipeds a little shorter than the ischium, and having its inner border thickened and raised. Sternum broad between the chelipeds and then suddenly becoming very narrow. Last pair of legs of normal size, arising a little in advance of the penultimate pair.

The abdomen in both sexes has all 7 terga separate.

108. *Notopus dorsipes*, (Fabr.) De Haan.

Pediculus marinus, Rumph, Amboin. Rariteitk. I. 29, pl. x. fig. 3.

Hippa dorsipes, Fabricius, Ent. Syst. II. 475.

Albunea dorsipes, Fabricius, Ent. Syst. Suppl. p. 397.

Ranina dorsipes, Latreille, Hist. Nat. Crust. et Ins. VI. 133, [and Encycl. Method. X. 268, pl. 287, fig. 2]: Milne Edwards, Hist. Nat. Crust. II. 195.

Notopus dorsipes, DeHaan, Faun. Japon. Crust. p. 139, pl. xxxv. fig. 5: Studer, Abh. Ak. Berl. 1882 (1883) p. 17, pl. i. figs. 6 a-b and pl. ii. figs. 7 a-d.]

The greatest breadth of the carapace—at the fronto-orbital border—is about two-thirds the greatest length.

On the fronto-orbital border are 5 spines of about equal size, separated by deep bights, the middle spine being the true front or rostrum: the outermost spines on either side form the antero-external angles of the carapace, are on a different plane from the others, and are joined across the carapace by a serrated ridge.

The carapace is a good deal pitted in the centre: the lateral borders in their anterior half have, like the surface of the merus of the external maxillipeds and of the greater part of the pterygostomian region, numerous squamiform granules; in their posterior half the lateral borders are finely raised, and milled. A raised ridge traverses the carapace in the middle line from the tip of the front nearly to the posterior border. The trigonal ischium of the chelipeds is somewhat swollen and has its outer surface tattooed with linear dents with hairy edges; the carpus has its dorsal surface serrated; the hand has hairy linear dents and squamiform rows of serrations on both its surfaces, but especially on the outer; and the dactylus has a smooth cutting edge and closes against a single distinctly large tooth at the tip of the immobile finger.

The true legs have one or both edges of many of their joints scantily fringed with long stiff hairs: except in the case of the last pair—in which the carpopodites and propodites are foliaceously expanded—these joints are only moderately expanded; and except in the case of the penultimate pair—in which the dactylus is foliaceous—this joint is broadly palmulate.

In the Indian Museum collection are specimens from the Andamans, and from off the Malabar coast 45 fathoms.

Cosmonotus, Adams & White.

Cosmonotus, Adams & White, 'Samarang' Crust. p. 60, 1848.

Cosmonotus, Dana, U. S. Expl. Exp., Crust. pt. I. p. 404.

Cosmonotus, Henderson, 'Challenger' Anomura, p. 32.

Carapace elongate-heptagonal in outline, strongly convex, the summit of the convexity forming a sharp mid-dorsal ridge. *Instead of a "front" there is a V-shaped excision*, filled by the basal joints of the eyestalks. The eyes are distinct, the eyestalks are slender and are of remarkable length: each orbit forms a narrow trench just beneath and along almost the whole length of either anterior border of the carapace, the two orbits together forming a very perfect and obvious V.

The antennules are almost hidden by the much larger and stouter antennæ, as in *Notopus*.

The maxillipeds, legs, sternum and abdomen are as in *Notopus*.

109. *Cosmonotus grayii*, Ad. & Wh.

Cosmonotus grayii, Adams and White, 'Samarang' Crust. p. 60, pl. xiii. fig. 3 (P. Z. S. 1847, p. 227, fig., and Ann. Mag. Nat. Hist. (2) II. 1848, p. 287): Stimpson, Proc. Acad. Nat. Sci. Philad. 1858, p. 241: Henderson, 'Challenger' Anomura, p. 33: [Cano, Boll. Soc. Nat. Napol. III. 1889, p. 256].

The carapace is unevenly covered with pits and dents which give it, when examined with a lens, a somewhat squamiform appearance. There is a small denticle on either side of the frontal notch and a claw-like spicule at either antero-external angle of the carapace—this is all the armature. The pterygostomian region is granular. The outer edge of the exognath is thickly fringed with hair, the merus and the outer margin of the ischium of the endognath are granular.

The chelipeds are hairy along the dorsal edge, and the edges of the legs—of the last pair especially—are hairy. The chelipeds are also a good deal pitted and dented, like the dorsum of the carapace.

The movable finger is rather strongly curved, and owing to the prominence of a single tooth just beyond the middle of the cutting edge, is curiously sickle-shaped.

In the Indian Museum collection is a single male from the Persian Gulf.

Raninoides, Milne Edwards.

Raninoides, Milne Edwards, Hist. Nat. Crust. II. 196.

Raninoides, Henderson, 'Challenger' Anomura, p. 27.

Carapace remarkably elongate-obovate, strongly convex from side to side, about twice as long as broad, its surface for the most part smooth, the regions undefined. Fronto-orbital border slightly less than the greatest width of the carapace. Eyes small but distinct, eyestalks broadly dilated at base, orbits slightly oblique.

Antennules about equal in size to the antennæ: antennæ with a stout peduncle and a rather short slender flagellum, the peduncle not concealing the antennulary peduncle. Merus of the external maxillipeds shorter than the ischium; its edges slightly thickened and raised. Sternum broad between the chelipeds and as far as the bases of the second pair of true legs, then becoming extremely narrow.

Last pair of legs abnormally short and slender, arising much in advance of the penultimate pair. The abdomen in both sexes consists of 7 separate segments.

110. *Raninoides personatus*, White, Henderson.

Raninoides personatus, White MS., Henderson 'Challenger' Anomura p. 27 pl. ii. fig. 5.

Carapace twice as long as broad. The lateral border in its posterior half is defined by a fine raised and milled line, and at either external orbital angle is prolonged into a spine, at a distance behind which equal to the distance between it and the rostrum is a second smaller, but still large, spine. The carapace between the two latter spines is finely punctate and in places granular, elsewhere it is smooth and polished.

The front consists of three teeth, the middle one of which alone is large and prominent forming the true rostrum, the lateral teeth being small: between each of these small lateral teeth and the external orbital spine, and separated from both by a fissure, is an angular lobe that completes the roof of the orbit. The whole fronto-orbital border is hairy. The pterygostomian regions are densely granular in a well defined band that occupies much more than their outer half.

The chelipeds have the ischium armed distally, on its inner border with a sharp slender spine: two similar spines occur towards the distal end of the carpus—the larger one being on the outer border, the smaller on the dorsal surface: a similar spine is found towards the far end of the outer border of the hand, and three occur along the inner border of the hand: the dactylus has a smooth cutting edge, but the opposed edge of the immobile finger is very sharply lacinate up to a sharp terminal spine. There is no spine on the outer edge of the dactylus. The third pair of true legs has its merus on both edges and the other joints on the posterior edge fringed with long stiff hairs, the second pair has similar hairs on the posterior edge of merus carpus and propodite, the first pair on lower edge of propodite.

Excluding the filiform last pair, the other legs have the carpus dorsally carinate, and the propodite and dactylus foliaceous.

In the Indian Museum collection are numerous specimens from the coasts of the Bay of Bengal, from 12 to 70 fathoms.

111. *Raninoides serratifrons*, Henderson.

Raninoides serratifrons, Henderson, Trans. Linn. Soc., Zool., (2) V. 1893, p. 408, pl. xxxviii. figs. 10–12.

Differs from *R. personatus* Henderson in the following particulars:—

(1) the rostrum is carinated, and it, as well as the dentiform lobe at either side of its base, has the edge sharply clearly and uniformly serrated:

(2) between the dentiform lobe at the base of the rostrum and the

external orbital spine is, not an angular lobe, but a sharp spine :

(3) the spine on the lateral border behind the external orbital spine is a mere spinule, and the carapace in front of a well defined transverse line that connects these spines is covered with small squami-form granules :

(4) there is no spine on the ischium of the chelipeds ; the wrist has its dorsal surface closely covered with somewhat scale-like granules ; the hand has its inner surface covered, but not nearly so closely, with rather larger granules and has its outer edge sharply bicarinate :

(5) the dactylus of the second and third pairs of true legs is sickle-shaped :

(6) the small last pair of legs are stouter.

In the Indian Museum collection are two specimens—a small female from off Ceylon 28 fms., and a large female from off the Malabar coast 45 fms.

Lyreidus, De Haan.

Lyreidus, DeHaan, Faun. Japon. Crust. p. 138.

Lyreidus, Henderson, 'Challenger' Anomura, p. 33.

Carapace elongate-obovate, the antero-lateral margins independent and gradually convergent ; strongly convex from side to side and slightly convex from before backwards ; smooth and polished, with the regions undefined. Fronto-orbital border less than half the breadth of the carapace. Eyes small ; eyestalks short, broad at base, orbits hardly oblique.

Antennules about equal in size to the antennæ : antennæ with a stoutish peduncle and rather short slender flagellum, the peduncle not concealing the antennular peduncle. .

Merus of the external maxillipeds a little longer than the ischium.

Sternum broad as far as the bases of the first pair of true legs, then becoming narrow. Last pair of legs abnormally short and slender, arising well in advance of the posterior pair. The abdomen in both sexes consists of 7 distinct segments.

112. *Lyreidus channeri*, Wood-Mason.

Lyreidus channeri, Wood-Mason, P. A. S. B., August, 1885, p. 104, and J. A. S. B., Vol. LVI. 1887, pt. 2, p. 206, pl. i.

Lyreidus gracilis, Wood-Mason, J. A. S. B., Vol. LVI. 1887, pt. 2, p. 376.

The greatest breadth of the carapace—considerably in rear of the front—is a good deal more than half its greatest length, and is about $2\frac{1}{2}$ times the width of the fronto-orbital border.

The rostrum consists of a simple flat acutely-triangular spine; on either side of it, projecting beyond it, separated from it by a deep bight, and parallel with its tip, is a long acicular spine forming the external orbital angle. The fronto-orbital region is hairy.

The gradually convergent antero-lateral borders are about two-fifths the length of the postero-lateral borders, the junction of the two borders being occupied by a long oblique acicular spine; and nearly midway between this spine and the spine at the external angle of the orbit on either side, is another similar but rather shorter spine. The postero-lateral borders are defined in more than their posterior half by a very fine raised line.

The surface of the carapace is finely and closely punctulate in all its anterior half, as are also the pterygostomian regions.

The eyestalks are broad and flat, and taper to the cornea, which has a somewhat lateral position and is a little deficient in pigment. The arms have a spine or two little spines near the middle of their dorsal surface: the wrist has a large spine in the distal half of its upper border: the hand has its outer (upper) edge carinate up to a subterminal denticle, and has its lower edge cut into two or three sharp teeth: the dactylus has its cutting edge faintly and irregularly sinuous, but by no means denticulate, and the opposed edge of the immobile finger is irregularly and rather bluntly jagged. The legs are almost free from hair, a few hairs occurring on the posterior edge of the propodite and dactylus of the third pair and on the last two joints of the rudimentary fourth pair only: in the first and third pairs the carpus is dorsally carinate and the propodite foliaceously expanded, in the first and second pairs the dactylus is little more than broadly palmulate, and in the third pair the dactylus is foliaceous. The third and fourth abdominal terga are armed each with a median recurved spine, in both sexes.

The largest female in the Indian Museum collection has the carapace 28.5 millim. long, a smaller ovigerous female has the carapace 26.5 millim. long.

Wood-Mason established his two species on two specimens, one of which—*L. chamberi*—had suffered a good deal from breakage and imperfect re-growth about the frontal region.

A considerable series of the specimens since obtained shows that the two supposed species are really one.

In the Indian Museum collection are numerous specimens, from the Andaman Sea 220 to 271 fms., from the Bay of Bengal 200 to 405 fathoms, and from both sides of Ceylon 296 to 406 fms.

Uniform salmon-colour in life, white in spirit.

EXPLANATION OF PLATES.


PLATE VI.

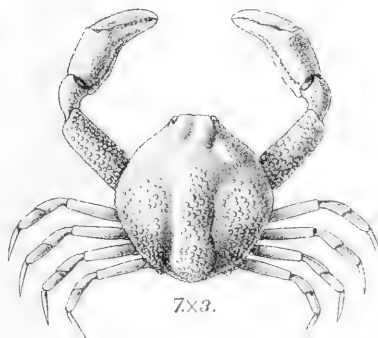
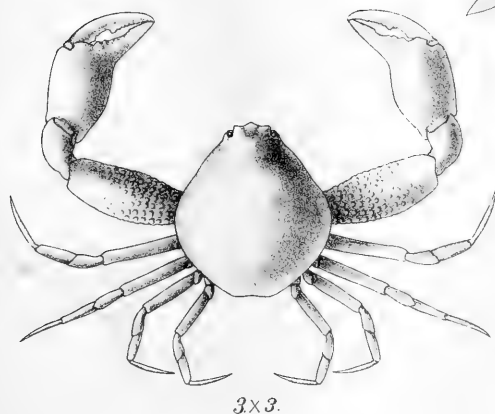
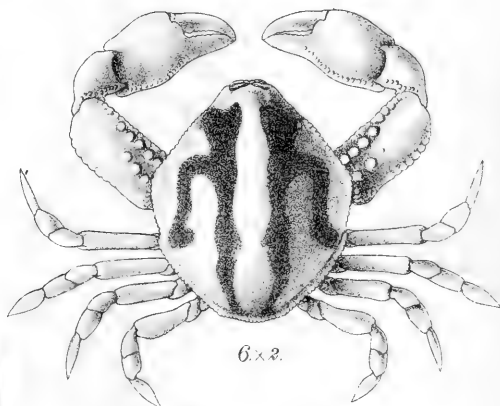
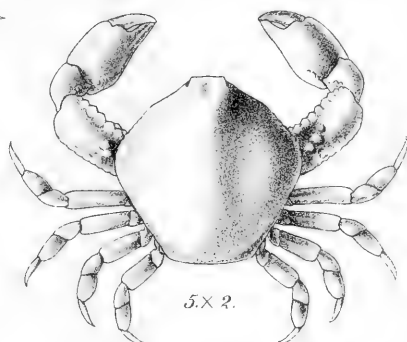
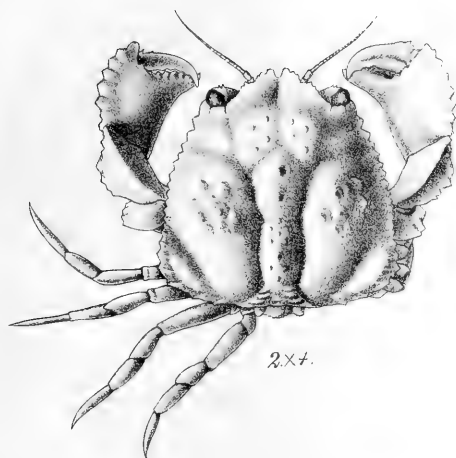
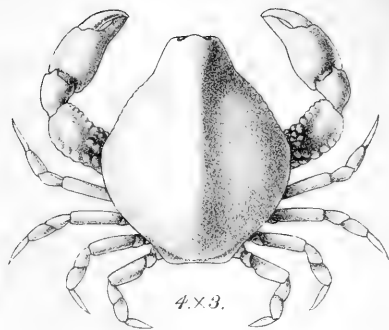
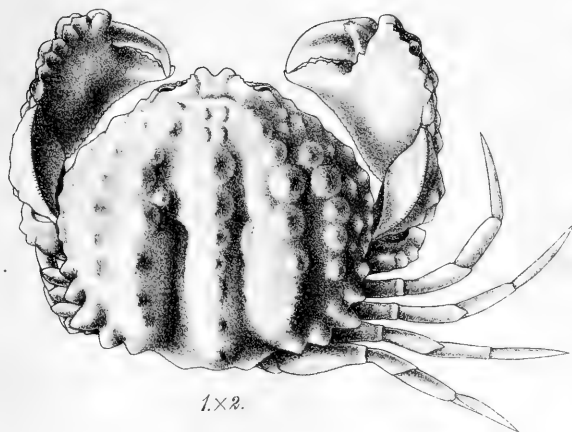
- Fig. 1. *Calappa pustulosa*.
„ 2. *Calappa woodmasoni*.
„ 3. *Pseudophilyra woodmasoni*.
„ 4. *Leucosia corallicola*.
„ 5. *Leucosia sima*.
„ 6. *Leucosia truncata*.
„ 7. *Pseudophilyra blanfordi*.

PLATE VII.

- Fig. 1. *Philyra corallicola*.
„ 2. *Philyra sexangula*.
„ 3. *Ebalia woodmasoni*.
„ 4. *Ebalia diadumena*.
„ 5. *Nursia blanfordi*.
„ 6. *Nursia nasuta*.
„ 7. *Nursia persica*.

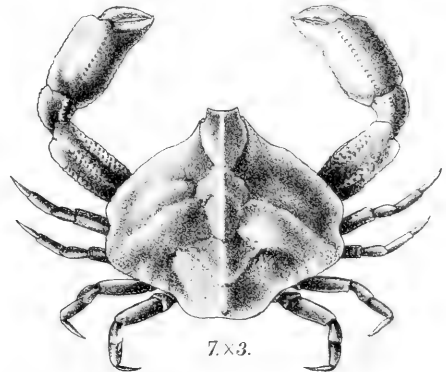
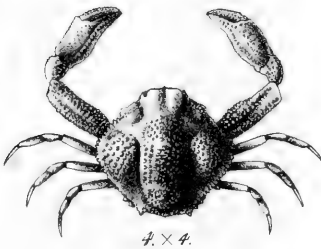
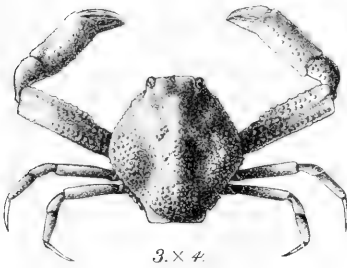
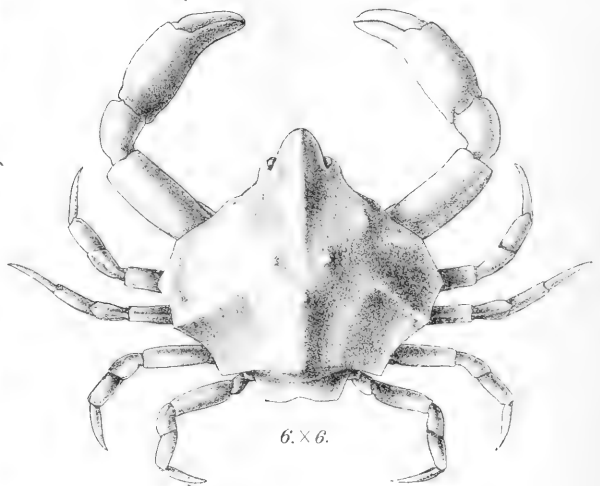
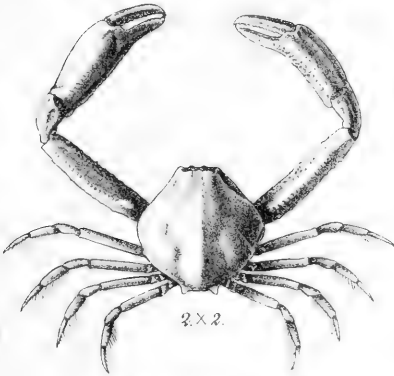
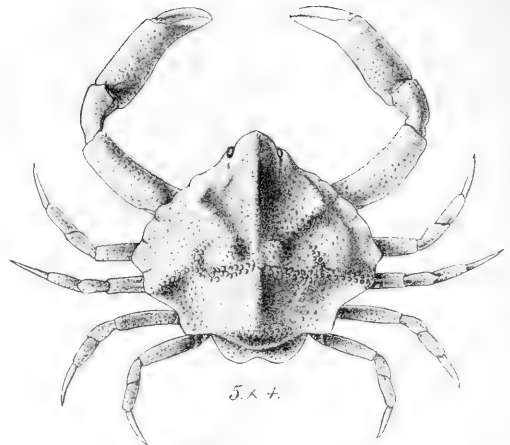
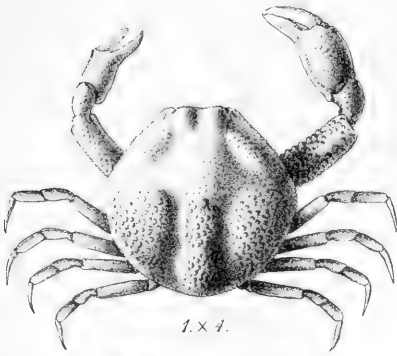
PLATE VIII.

- Fig. 1. *Heteronucia vesiculosa*.
„ 2. *Pariphiculus rostratus*.
„ 3. *Actæomorpha morum*.
„ 4. *Tlos patella*.
- 



S. C. Mondul del. et. lith.

1. *Calappa pustulosa*, ♂ 2. *Calappa wood-masoni*, ♂ 3. *Pseudophilyra wood-masoni*, ♂.
 4. *Leucosia corallicola*, ♂ 5. *Leucosia sima*, ♀ 6. *Leucosia truncata*, ♀.
 7. *Pseudophilyra blanfordi*, ♂.

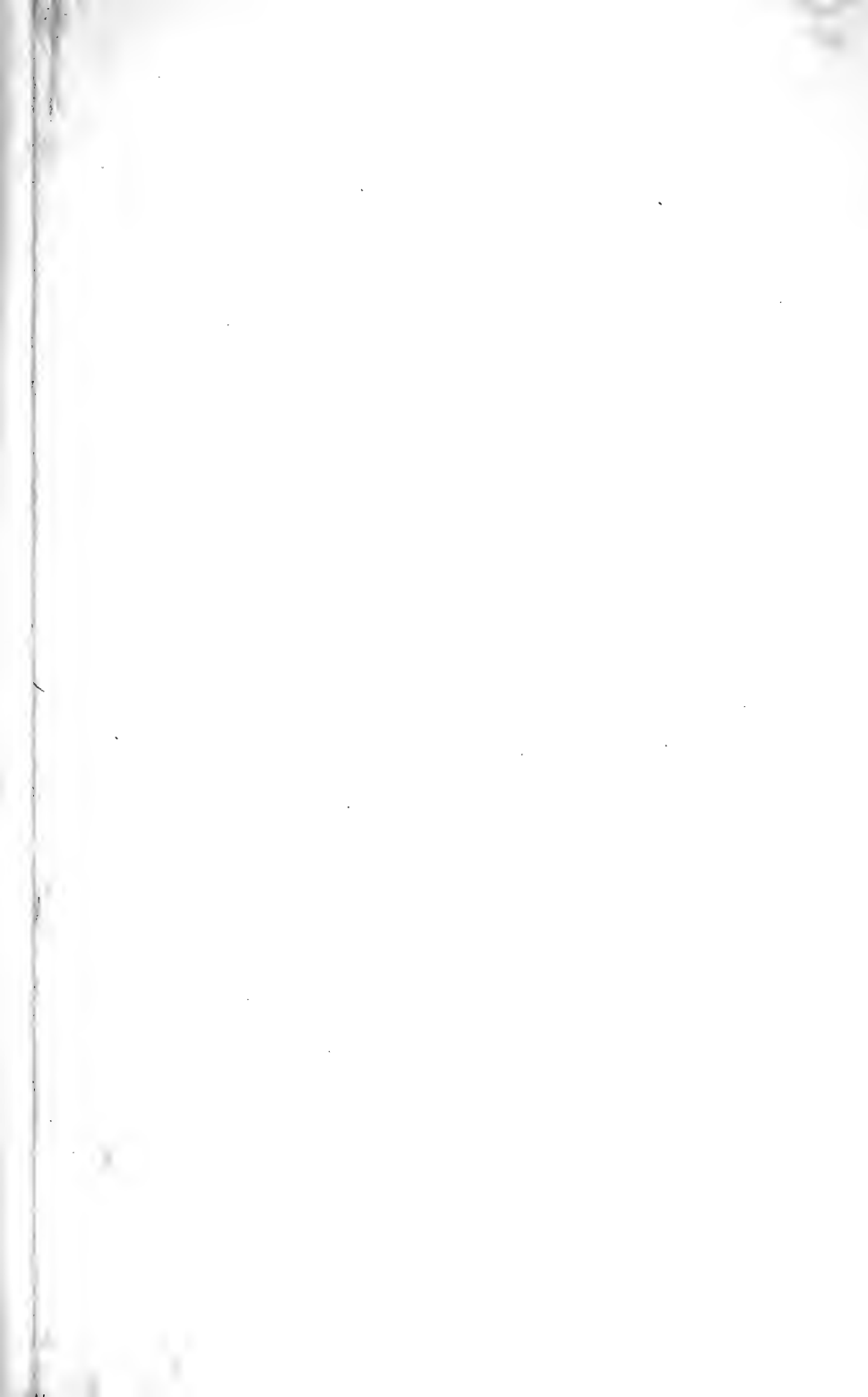


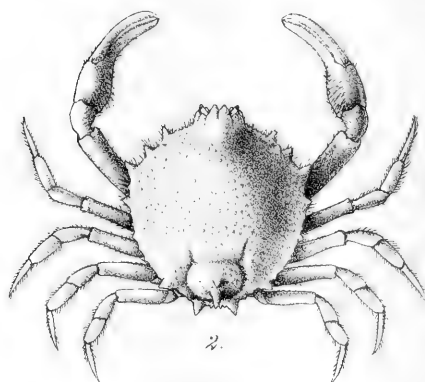
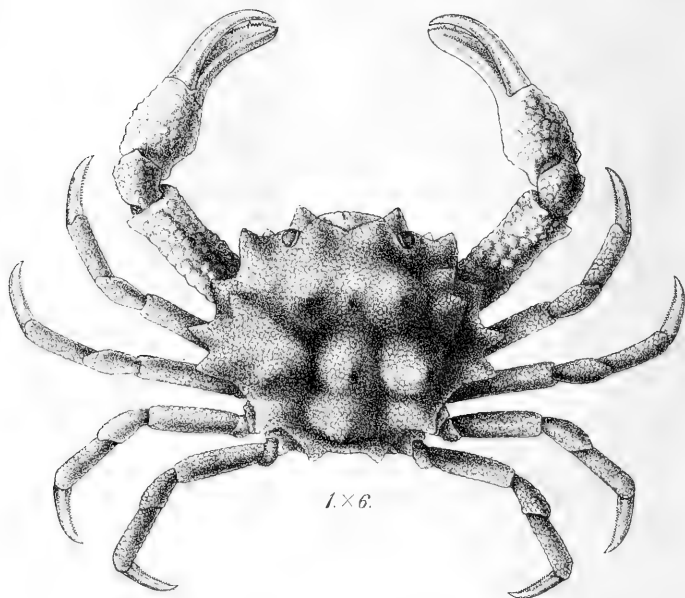
A.C. Chowdhary & S. C. Mondul del.

A.C. Chowdhary lith.

- | | | |
|------------------------------------|----------------------------------|-----------------------------------|
| 1. <i>Philyra corallicola</i> , ♂. | 2. <i>Philyra sexangula</i> , ♂. | 3. <i>Ebalia wood-masoni</i> , ♂. |
| 4. <i>Ebalia diadumena</i> , ♀. | 5. <i>Nursia blanfordi</i> , ♀. | |
| 6. <i>Nursia nasuta</i> , ♂. | 7. <i>Nursia persica</i> , ♀. | |





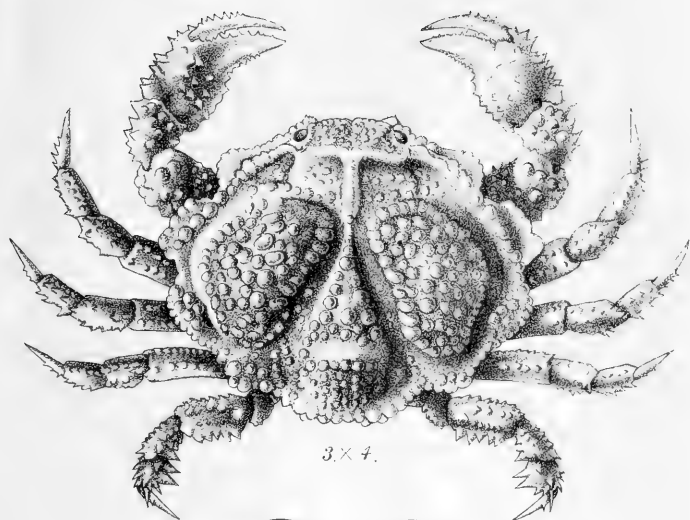


S.C. Mondul & A.C. Chowdhary del.

1. *Heteronucia vesiculosa*, ♀. 2. *Pariphiculus*

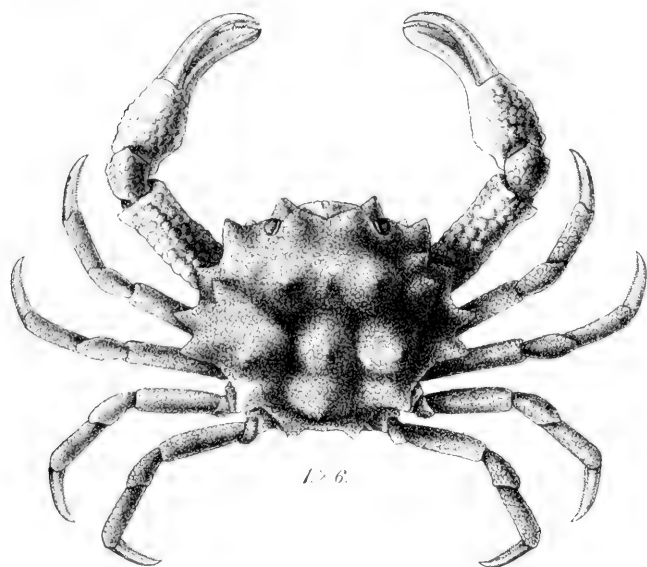
4. *Tlos*

PLATE VIII.

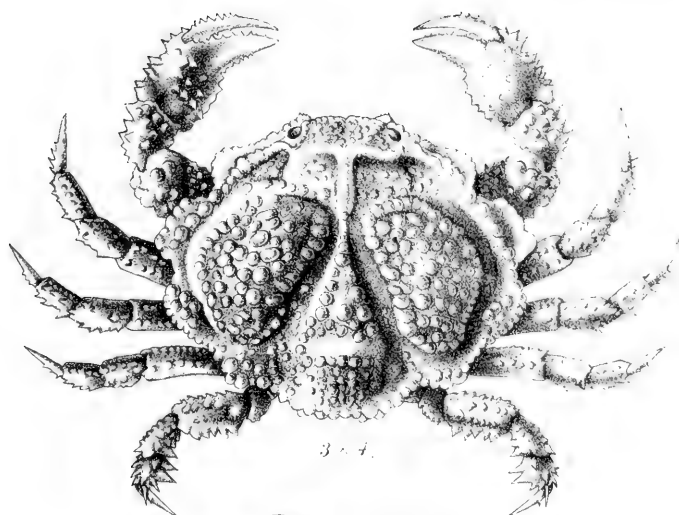


S. C. Mondul lith.

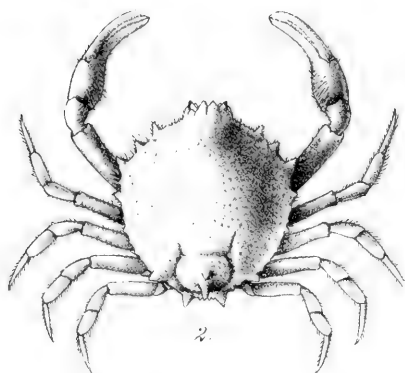
ostratus, q. 3. Actaeomorpha norum, q.
atella, q.



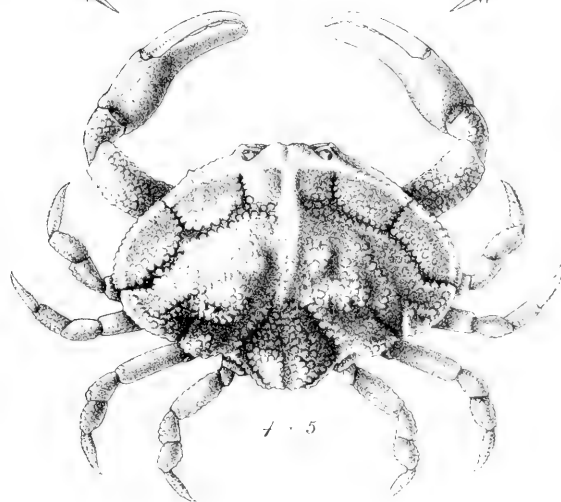
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3 & 4.



2.

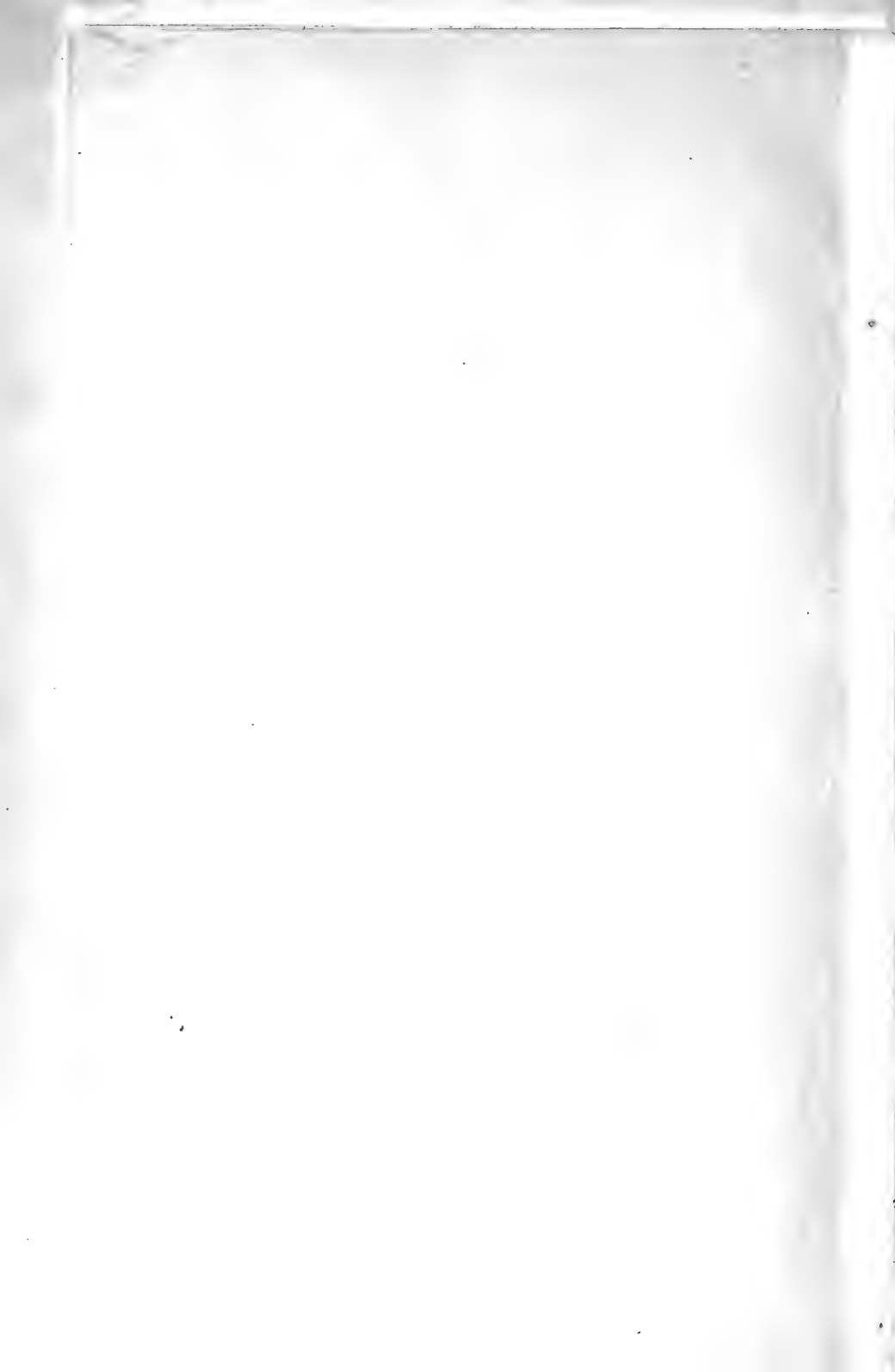


4 & 5.

S.C. Mondul & A.C. Chowdhary del.

S.C. Mondul lith.

1. *Heteronucia vesiculosa*, ♀. 2. *Pariphiulus restratus*, ♀. 3. *Actaeomorpha noman*, ♀.
4. *Tlos patella*, ♀.







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